

MINING

CONGRESS JOURNAL

SEPTEMBER
1943

JOURNAL
for the
ENTIRE
MINING
INDUSTRY

Published
by the
AMERICAN
MINING
CONGRESS



... America's mines
can depend on Exide Ironclad power



AMERICA depends on its mines and miners today. It's going to take top peak production to whip the Axis... but America's mines and miners have the "know-how" to do the job.

Using the most modern of equipment, our mines are producing the coal, ores, and minerals which today are America's lifeblood. Exide Ironclad Batteries are sharing the job, providing dependable

sources of electric power for shuttle cars, electric locomotives, and trammers.

Exide Ironclads can handle this job, they're designed to give a giant surge of power where it's needed the most. Their long life is a guarantee of economy and complete efficiency. When you buy an Exide Ironclad, you *buy to last*... take care of your batteries and *save to win*.

THE ELECTRIC STORAGE BATTERY
Philadelphia
Exide Batteries of Canada, Limited, Toronto

Exide
IRONCLAD
BATTERIES

BACK THE ATTACK WITH WAR BONDS — LET'S OVER-SUBSCRIBE THE 3rd WAR LOAN

SULLIVAN CORE DRILLS

Keep discovery and development
well ahead of production



Montana Mine's No. 6 proves value

2 shifts daily located more ore than could be developed, so No. 6 drill went on one shift. Users got up to 100 feet more than its rated 250 ft. capacity ($\frac{3}{4}$ " core). Drilled 4734 ft. in hard quartz, 666 ft. vein material, in 14 months. Average hole 163.4 ft. Average foot cost (everything) \$0.758. Average foot cost compressed air \$0.039. Footage per drilling hour 2.74; per working hour 2.13.

Tennessee Mine's No. 12 cuts discovery, development costs $\frac{1}{3}$ rd.
Chrome mine turned to core drilling for selective, accurate follow-up of ore bodies, picked Sullivan No. 12—cut costs one-third. 18 months of 5-days-a-week hard service showed drill repair and maintenance total 75¢!



The No. 6

Rated at 250 feet with $\frac{3}{4}$ " core, is a one-man drill in every way... moving, setting up, operating and handling rods.



The No. 12

Rated at 400 feet with $1\frac{1}{2}$ " core, weighs 470-460 lbs. Air or electric driven. Column or skid mounted. Screw or hydraulic feed.



The No. 22

Rated at 650-800 feet with $1\frac{1}{2}$ " core. Weighs 1390 lbs. Airelectric driven.

SULLIVAN PRODUCTS

**ROCK DRILLS • AIR COMPRESORS • SCRAPER HAULERS
HOISTS • LOADERS • CORE DRILLS**
CONTRACT CORE DRILLING



SULLIVAN

UNDERGROUND CORE DRILLS

MINING CONGRESS JOURNAL

VOLUME 29, NUMBER 9

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FOR SEPTEMBER 1943

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Editor
HARRY C. CHELLSON

Associate Editors
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P. D. McMURRER B. C. WILKERSON
CAPT. H. L. MOFFET, U.S.A.
(*On Leave*)

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Circulation
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Funds will be raised for morale-building purposes for our fighting men and for war relief agencies, through the National War Fund, from October 1 to December 1.

Its purpose is to raise and distribute funds to meet the reasonable requirements of approved war related appeals in cooperation with 6,000 local campaigns throughout the country. Contributions to this fund strike with greater power than any secret weapon, because it is a concrete expression of faith in which every single American can unite, to the confusion of the enemy.

Mining communities can be depended upon to do their share.

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress.



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THE AMERICAN MINING CONGRESS

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HOWARD I. YOUNG, President LOUIS S. CATES, Vice President
DONALD A. CALLAHAN, Vice President JAMES D. FRANCIS, Vice President
JULIAN D. CONOVER, Secretary



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The Advantages of Mechanization are proved in the White Heat of War

Joy Mechanized Mining Units—Loaders, Shuttle Cars and Conveyors, are doing an outstanding job in helping operators to increase and maintain tonnage output.

The experience of Joy Engineers in many mines, some perhaps under conditions similar to yours, is at your service. We will be glad to confer with you.

JOY
Mechanized
Mining
Units

Joy Loaders have proved their worth in hard, constant service with the most severe usage. Strong, ruggedly built, their maintenance is at a minimum.



U. S. ARMY SIGNAL CORPS PHOTO—FROM FREDERIC LEWIS



OFFICIAL NAVY PHOTO—
FROM WING GALLOWAY



FREDERIC LEWIS PHOTO



FREDERIC LEWIS PHOTO

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JOY
MANUFACTURING COMPANY
FRANKLIN, PA.

*Call in a
Joy Engineer*

Joy Shuttle Cars cut costs and speed-up output... entirely mobile
...easy to handle... designed specifically for mine service with
a built-in ability to stand up under hard use.

Working and Saving Keep Them Waving



THREE TIMES WON FOR EXCELLENCE IN WAR PRODUCTION

Richard Kauzlarich, husky machine operator, topped the winners in 14 other departments with a work record average of 10 hours and 48 minutes nightly since the first of the year. To him went the honor of hoisting the Navy E flag awarded for the third time to the employees and management of the Union Wire Rope Corporation. To him (and his 3 year old son, Richard, Jr.) went the congratulations of Rear Admiral Alex M. Charlton, U.S.N., Inspector of Navy Material, Chicago.

In praising the company's production record, Rear Admiral Charlton said the wire rope it has made for the Navy in recent months would stretch from the Union Wire Rope plant to Guadalcanal, take a hitch around a palm tree and extend on to Australia.

Union Wire rope employees are pledged to save to keep the Treasury Minute Man burgee flying. The men and women of Union Wire Rope are also working day and night to produce wire rope so vital to winning the war.

• To Help All Industry... SAVE Wire Rope... Keep It WORKING...

Your wire rope still faces a tough assignment. It must continue to work overtime, often under overload, with chances of replacement limited.

Why? Because modern warfare is dependent upon wire rope to hoist, handle, load and unload vast tonnages of war materials.

To help you save wire rope and keep it working, we offer free for the asking, 5 booklets, entitled:

1. Splicing Wire Rope, 2. Socketing Wire Rope, 3. Correct

5 BOOKLETS
FREE!



Handling of Wire Rope, 4. Lubrication of Wire Rope. These give you specialized information. Rope Dope (5) amplifies on abuses of wire rope and their remedies. All are written in non-technical terms. Put into practice, the information these booklets contain will stand you in good stead now and post-war.

UNION WIRE ROPE CORPORATION
2144 MANCHESTER AVE. KANSAS CITY 3, MO.

union WireRope corporation



YOU SAID IT, SOLDIER

"The lumbering unprotected C-47's have become the aerial Mack trucks of this war in North Africa"

—from "Stars and Stripes", the soldiers' newspaper

If you've ever seen a Mack in action, you know why Stars and Stripes' soldier-reporter called those husky Douglas Skytrains "Mack trucks". For years, Americans have used the word "Mack" as an adjective to mean the best in cargo-carrying dependability.

Soldiers learned to respect Mack trucks in the last war. They watched Macks plow through Argonne mud so deep you couldn't see the wheels. In World War II, they're seeing even better Macks take even bigger loads through worse mud—and through shifting sand and freezing snow as well. They know a Mack will haul whatever you've got wherever you want it to go!

Yes, the soldiers in this war, too, will know what the phrase "Built Like a Mack" *really* means!

Mack Trucks, Inc., Empire State Building, New York, N. Y.
Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick,
N. J. Factory branches and dealers in all principal cities for
service and parts.





Mack

TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!

To Save Time at the



For larger motors, these 2300-volt starters combine EJ-2 current-limiting fuses and an oil-immersed contactor in a protective, metal cubicle. Side by side, they form a unit control board, with convenient bus connections to a "matching" incoming-line panel.

Compact assemblies of G-E magnetic starters in cubicles like this save installation wiring time. Our past experience in supplying them to other mines is a factor in reducing lay-out time.

This group-assembled equipment for high-voltage, mine-hoist control is typical of assemblies on which G-E Engineers can help you save time by making greatest possible use of standard available units.

G-E combination magnetic switches in standard enclosures are quickly available for war-essential jobs. They have proved highly popular at coal preparation plants.



Tipple

Meet the

SPECIAL NEEDS of COAL PREPARATION with STANDARD G-E CONTROL

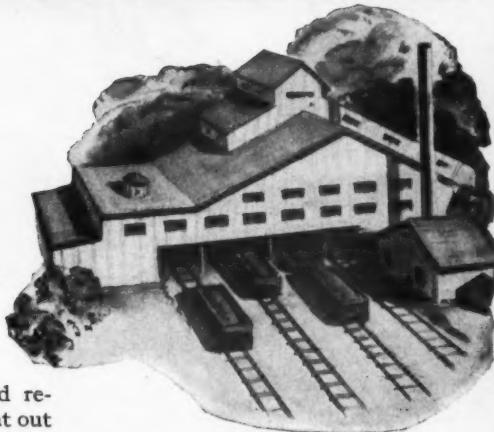
Are you looking for a way to simplify the planning and speed up the installation of electric control at coal preparation plants? Do you want motor starters that are *especially* suitable for coal-plant service, yet avoiding delays for special engineering?

Here are the reasons why G.E. can help you unusually well:

1. We have an exceptionally wide range of *standard* starters and control units—furnished in dust-tight, water-tight, or "permissible" enclosures, as well as in general-purpose construc-

tion. Almost any coal-field requirement can be met "right out of the catalog," saving the time demanded by special designs.

2. G.E. has pioneered in developing self-contained combination motor-starters and cubicle-type control assemblies that are "set to go" once external connections are made. These units facilitate layout and save time in wiring.
3. G-E Engineers have "on tap" a broad fund of experience in applying the right control unit to the job. They'll help you



plan an integral motor-control system for the entire preparation plant—a system that "goes together" easily and saves on maintenance.

Underground, too, you'll find that G.E. has control equipment that can simplify and speed up the installation job, such as our new "Class BM" explosion-proof controllers. Better get in touch with your G-E representative today. *General Electric Company, Schenectady, N. Y.*



Standard G-E air circuit breaker, installed underground for protection of mine trolleys at cross-entries

...this enclosed a-c magnetic controller (Class "BM") is rated as *permissible* for gassy mines, having passed Bureau of Mines tests. Available in a wide range of sizes, it is finding important applications as a result of the increasing use of a-c underground.

GENERAL ELECTRIC



TO HIT 'EM H-A-R-D-E-R



THE year 1943 promises to be the grimdest, hardest year this country has ever faced. Every effort, and every dollar of national income not absolutely needed for existence, should go into war work and War Bonds.

In the Pay Roll Savings Plan, America finds a potent weapon for the winning of the war—and one of the soundest guarantees of the preservation of the American way of life!

Today about 30,000,000 wage earners, in 175,000 plants, are buying War Bonds at the rate of nearly half a billion dollars a month. *Great as this sum is, it is not enough!* For the more dollars made available now, the fewer the lives laid down on the bloody roads to Berlin and Tokio!

You've undoubtedly got a Pay Roll Savings Plan in your own plant. But how long is it since you last checked up on its progress? *If it now shows only about 10% of the gross payroll going into War Bonds, it needs jacking up!*

This is a *continuing* effort—and it needs continual at-

tention and *continual* stimulation to get fullest results.

You can well afford to give this matter your close personal attention! The actual case histories of thousands of plants prove that the successful working out of a Pay Roll Savings Plan gives labor and management a common interest that almost inevitably results in better mutual understanding and better labor relations.

Minor misunderstandings and wage disputes become fewer. Production usually increases, and company spirit soars. And it goes without saying that workers with substantial savings are usually far more satisfied and more dependable.

And one thing more, these War Bonds are not only going to help win the war, they are also going to do much to close the dangerous inflationary gap, and help prevent post-war depression. The time and effort *you* now put in in selling War Bonds and teaching your workers to save, rather than to spend, will be richly repaid many times over—now and when the war is won.

You've done your bit  **Now do your best!**

This space is a contribution to victory today and sound business tomorrow by

THE MINING
CONGRESS JOURNAL

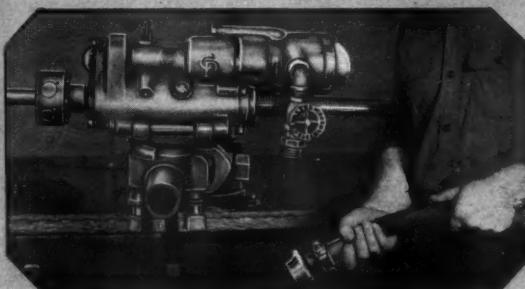
Clean, Dry Air— Regular Lubrication—



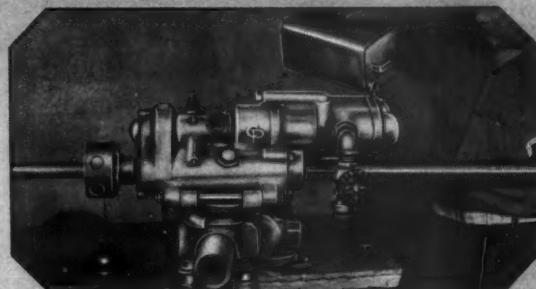
HELP TO KEEP DIAMOND DRILLS IN SERVICE

Keep these simple facts in mind: air lines inevitably pick up dirt and moisture during shutdowns; regular lubrication is essential to the best performance of any drill. Blow your air lines free of moisture before starting work...keep your diamond drills lubricated...give them a good general cleaning at regular intervals...and CP Diamond Drills will give the hard, steady service for which they are designed and built.

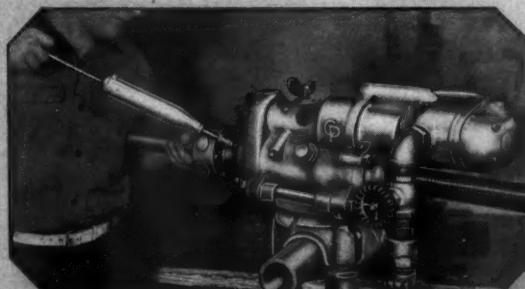
HOW TO GET MAXIMUM SERVICE FROM YOUR CP DIAMOND DRILL



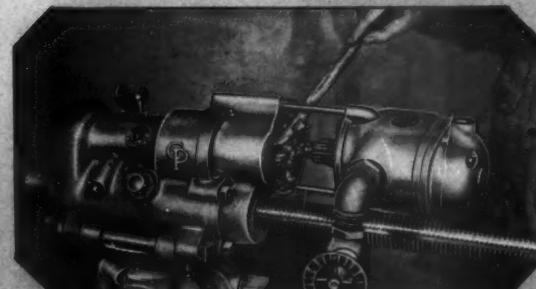
- 1 Before attaching hose, always blow out the air line to clear it of moisture and dirt.



- 2 At the beginning of each shift, fill oil reservoir with about four ounces of S.A.E. 10 oil.



- 3 There are seven grease fittings on your CP Diamond Drill. Grease each fitting daily.



- 4 Once a week remove motor and pack rear housing cover with new grease.



PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal).
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N.Y.



AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

WHEN OUNCES FEEL LIKE POUNDS



*Reg. U. S. Pat. Office

1230 SIXTH AVENUE
ROCKEFELLER CENTER, NEW YORK 20



UNITED

...ASSAULT TROOPS USE LAYTEX*



You know how it is. You slog along all day under full equipment. At first you don't mind the weight very much. But as the hours crawl along, everything you're toting gets heavier and heavier. The canteen you didn't notice in the early stages now weighs as much as your rifle did then. And your rifle feels like a howitzer. Every ounce turns into a pound.

That's why . . . when you're moving fast and the going is tough . . . it's smart to use Laytex Assault Wire.

A full mile of Laytex Assault Wire weighs less than 30 pounds.

Laytex Assault Wire has a breaking strength of 50 pounds per conductor and a talking distance of more than 5 miles.

Laytex resists concussion and a wide range of temperature changes.

It is flexible and waterproof, strong and tough.

Conductors are accurately centered and the weight of insulation and the diameter of the insulated conductor are kept at the minimum.

All this adds up to the fact that one man, wearing a breast reel of Laytex Assault Wire can move swiftly and easily. One man can maintain sure communication with operational headquarters.

Listen to the Philharmonic Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

STATES RUBBER COMPANY

Answers to Your Questions About THE POSTWAR CUMMINS DEPENDABLE DIESEL

Question: We are told that miraculous, revolutionary developments in plastics, electronics, aviation and many other fields of industry merely await the ending of the war. Will this hold true also of the postwar Cummins Dependable Diesel?

Answer: The postwar Cummins Diesel will not be a "miracle" diesel. The dramatic, pioneering stage of diesel development which caught the public's fancy a decade or so ago has passed. But the man who understands diesel engines in relation to the power needs of heavy-duty industry will find many "revolutionary" features about the new models, in the sense that he will be able to use the Cummins Diesel in many new ways and places and equipment . . . and use it at a considerably lower cost than ever before.

Question: Is it possible now to say what new features the postwar models will have?

Answer: Only in general terms. Specific details are at present marked "confidential" for obvious reasons. Then, too, the picture is ever changing—today's specifications might be altered by tomorrow's findings. We can say, though, that these new features apply to almost every phase of design and operation . . . cooling, lubrication, material specification, etc. *All changes will have the vitally important over-all effect of increasing horsepower output per pound of engine weight . . . simplifying and reducing maintenance requirements . . . extending the engine's efficient "work life."*

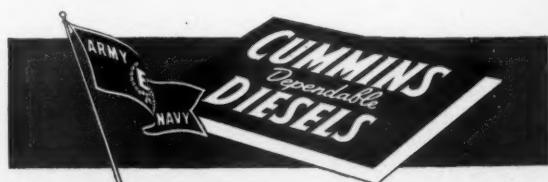
Question: Is the development of postwar models being carried on as an independent project, separate and apart from Cummins' production-for-war program?

Answer: No. Just prior to the war, we completed one of the finest diesel research laboratories in the country. We expected to use it exclusively for the development of future models. But with the coming of war, this laboratory—like every other facility we possess—was turned over to research projects directly connected with our present production for the armed forces. For example: scarcity of a certain metal or alloy may threaten production. The lab turns to a search for a substitute, frequently comes up with a material better than the

original. Or, certain engines may be destined for service where extreme and unusual operating conditions exist. In the laboratory, these specific problems are solved, perhaps by a minor change in cooling or lubrication, and this change may be worth incorporating on all models. *Thus it is that the improvements and refinements you will find on your postwar Cummins Diesel are the direct result of our efforts to give our fighting forces the best fighting tools we know how to build.*

Question: Will postwar models make current or pre-war models obsolete, from the standpoint that parts for old engines will not be available in the future—or interchangeable with parts for new engines?

Answer: No. It has always been a cardinal point in Cummins policy to assure the continued operation of the engine by providing replacement parts, regardless of how old the engine may be. Furthermore, we are constantly trying to reduce the owner's maintenance problems and we know from experience that one of the best ways of doing this is by preserving the interchangeability of parts to the furthest extent consistent with sound design and operating efficiency. It has never been in our scheme of things to make an annual event of "new models." Improvement and refinement are a painstaking, continuing process. True, war has greatly stimulated this process . . . enabled us to do ten years' work in one or two. But war has in no way swerved us from our purpose . . . which is to make each day's Cummins Diesel better than the day's before . . . but to make every owner who bought a Cummins Diesel yesterday glad that he owns it today.



CUMMINS ENGINE COMPANY • COLUMBUS, IND.

A New Automatic Duckbill by Goodman

The new Type E Duckbill loading head for Goodman shaker conveyors has all of the operating advantages of earlier types plus these outstanding features:

- ease and simplicity of operation, no "kick" is transmitted to the control levers
- greater extension of the shovel trough, permitting cleanup of wider faces
- spring type bumpers on sliding shoe and shovel trough lessen shock

*These and other advantages
are described in detail in
our new Shaker Conveyor
Bulletin. Send for your copy.*



GOODMAN MANUFACTURING COMPANY • HALSTED STREET AT 48TH • CHICAGO, ILLINOIS

MARIONS

OFF TO WAR ! !

Carloads of MARIONS roll out of the company's yard daily to unrevealed destinations.

They are heading for active duty on many fronts and under all kinds of operating conditions. In Africa, India, Britain, Alaska, Iceland and the South Pacific, MARIONS are giving a good account of themselves . . . a befitting tribute to proven performance.

The Marion cranes shown above packed for shipment to sea-board and overseas service.

THE MARION

STEAM SHOVEL COMPANY, MARION, OHIO, U.S.A.

SHOVELS • DRAGLINES • CRANES • CLAMSHELLS • WALKERS
PULL-SHOVELS • COAL LOADERS • STRIPPING SHOVELS
GAS • DIESEL • ELECTRIC (From $\frac{1}{4}$ Cu. Yd. to 35 Cu. Yds.)



**THERE'S EXTRA WALLOP BUILT INTO
EVERY PHILCO LOCOMOTIVE BATTERY!**



**PHILCO BATTERIES ARE ENGINEERED TO DELIVER
SUSTAINED HIGH VOLTAGE, HOUR AFTER HOUR!**

It takes a rugged locomotive battery—one that will deliver high voltage hour after hour—to keep mine production on top of war schedules.

But you can count on a Philco to do the job, and do it at lower haulage cost per ton! Every Philco cell is engineered to give you *extra wallop* not only when the battery is fully charged but right up to the time it goes back to the charging room.

The sustained high voltage you get in a Philco battery hauls more tons per charge...keeps the operation going at high speed!

There's maximum capacity in a Philco, too—coupled with long productive life. Together these Philco features add up to the most efficient battery you can buy for today's mining service.

Write for the latest Philco Mine Battery catalog.

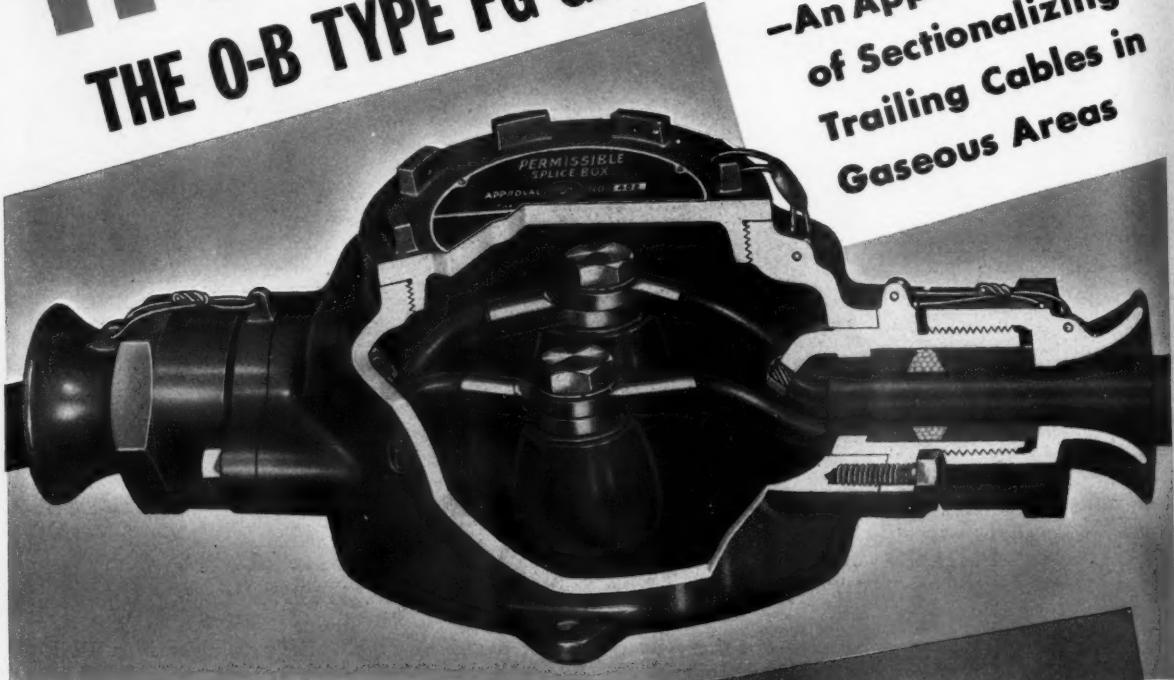
PHILCO CORPORATION, STORAGE BATTERY DIVISION, TRENTON 7, NEW JERSEY



Replace with **PHILCO** *Mine Batteries*

IT'S NEW THE O-B TYPE FG GAS-PROOF SPLICE BOX

-An Approved Means
of Sectionalizing
Trailing Cables in
Gaseous Areas

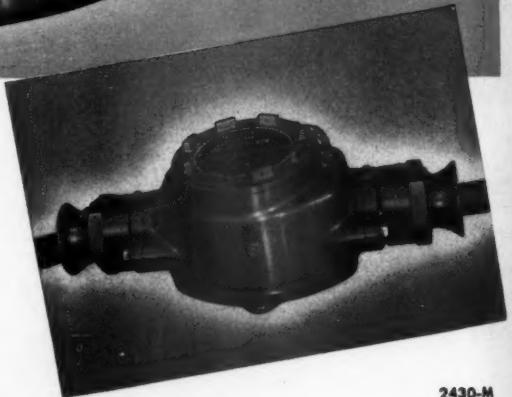


APPROVED BY THE U. S. BUREAU OF MINES

Only Six Bolts to Tighten for Positive,
Gas-Tight Splice.

Glands Assembled and Sealed On Cable
Ends—No Need to Repack in Making or
Changing Connections.

Permanent, Boltless Safety Ground Connection.



2430-M

CLIP AND MAIL TODAY FOR BOOKLET

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

KEEP BUYING WAR BONDS

Ohio Brass Company • Mansfield, Ohio

Yes, I'd like to know more about the new O-B Type FG Gas-Proof Splice Box. Please send complete details and cataloging information to:

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

UP AND DOWN
THE MOUNTAIN
FOR 15 YEARS.

WITHOUT A
BEARING
FAILURE

General view showing cars at the Montcoal Mine.

That's the record of the Timken Bearing Equipped monitor cars at the Montcoal Mine of the Colcord Coal Company, Raleigh County, West Va.

These cars are used to lower the coal down the mountainside from head house to tipple by gravity, the descending loaded car pulling up the empty. The cars are from 10 to 13-ton capacity and the use of Timken Bearings on the axles has proved to be an important factor in preventing wrecks on the steep descent because Timken Bearing Equipped wheels turn smoothly—never stick. Further advantages are the extending of lubrication periods and reduction of maintenance attention.

Does it pay to operate Timken Bearing Equipped mine cars? The experience of more than 1,000 mine operators is your best answer. The Timken Roller Bearing Company, Canton, Ohio.



Timken Bearing Equipped monitor car ending descent. These cars were built by Phillips Mine & Mill Supply Co., Pittsburgh, Pa.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



**ON
SEPT.
9TH**

9



Your Bond Selling Responsibilities Double!

Starting September 9th, your Government will conduct the greatest drive for dollars from individuals in the history of the world—the 3rd War Loan.

This money, to finance the invasion phase of the war, must come in large part from individuals on payrolls.

Right here's where YOUR bond selling responsibilities DOUBLE!

For this extra money must be raised *in addition* to keeping the already established Pay Roll Allotment Plan steadily climbing. At the same time, every individual on Pay Roll Allotment must be urged to dig deep into his pocket to buy *extra* bonds, in order to play his full part in the 3rd War Loan.

Your now *doubled duties* call for these two steps:

1. If you are in charge of your Pay Roll Plan, check up on it at once—or see that whoever is in charge, does so. See that it is hitting on all cylinders—and *keep it climbing!* Sharply

increased Pay Roll percentages are the best warranty of sufficient post war purchasing power to keep the nation's plants (*and yours*) busy.

2. In the 3rd War Loan, every individual on the Pay Roll Plan will be asked to put an *extra two weeks salary* into War Bonds—over and above his regular allotment. Appoint yourself as one of the salesmen—and see that this sales force has every opportunity to do a real selling job. The sale of these *extra* bonds cuts the inflationary gap and builds added post-war purchasing power.

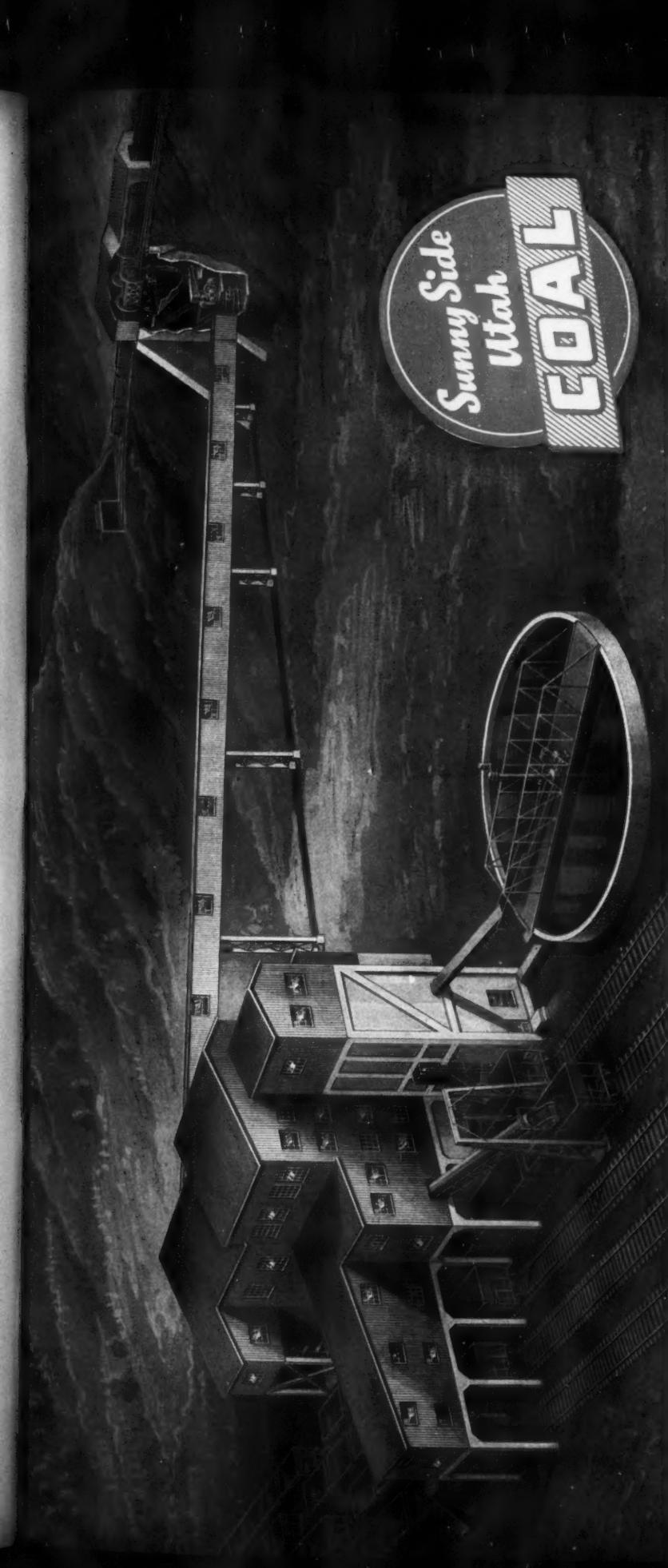
Financing this war is a tremendous task—but 130,000,000 Americans are going to see it through 100%! This is their own best *individual* opportunity to share in winning the war. The more frequently and more intelligently this sales story is told, the better the average citizen can be made to understand the wisdom of turning every available loose dollar into the finest and safest investment in the world—United States War Bonds.

BACK THE ATTACK With War Bonds!



This space is a contribution to victory today and sound business tomorrow by

THE MINING
CONGRESS JOURNAL



Utah Fuel Co. Modernizes Sunnyside Preparation

● Utah Fuel Co.'s second completely modern Link-Belt preparation plant is now under construction at Sunnyside, Utah. Their first, put in service early in 1940, has produced outstanding results in cleaning, drying, sizing, blending and loading their famous Castle Gate coal.

The fine performance of this plant led them to again select Link-Belt to design and build the plant illustrated above, for preparing the output of two mines in the same seam at Sunnyside. Some of this coal will go to the by-product coke ovens at the steel mill of Kaiser Co., Inc., located at Fontana, California, some will be coked at Sunnyside and the balance prepared for domestic, commercial and steam markets.

The overall capacity of the plant is 380 tons of r.o.m. per hour, with washing (Link-Belt air pulsated washer) provided to the extent of 250 t.p.h. of minus 3", which will be classified after cleaning, into a number of sizes.

Two rotary dumpers set over a common hopper can handle coal from the two mines simultaneously or separately, as desired. A Link-Belt crusher below the hopper reduces the raw coal to 6" and below, before going to the preparation plant where facilities are provided for cleaning, drying, sizing, blending and loading.

LINK-BELT COMPANY
Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2,
Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4,
Toronto 8, Vancouver 7

6738

LINK-BELT COAL PREPARATION EQUIPMENT



One of the limiting factors in any underground mining program of increased production is the hoisting capacity. The normal problems of efficient operation and minimum maintenance are magnified because of the need for using inexperienced operators. Complicated manual controls are difficult for them to handle and the tendency is for them to overload the electrical equipment in an attempt to increase tonnage.

To produce more tonnage it may be necessary to install entirely new hoisting equipment, or provide more efficient and accurate control for equipment already installed.

In either case, this can be accomplished best by means of a development first introduced 15 years ago by Westinghouse to control the feed of welding rod for automatic welding. Later it was successfully applied to govern the operation of

elevators in such skyscrapers as the RCA Building in Rockefeller Center. This Westinghouse development, the Rototrol, eliminates the human factor in control, to provide smoother, faster acceleration and retardation of the hoist. It permits loading equipment to capacity without overloading. It keeps current requirements down, and it reduces down-time for maintenance. All this means increased wartime tonnage. Your nearest Westinghouse representative will be glad to show you how Rototrol can be applied to your problem. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

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Gold for Monetary Stabilization

INTERNATIONAL post-war planning, particularly in respect to stabilization of monetary systems, prevention of breakdowns in foreign exchange markets and the revival of international trade after the war, continues apace.

Monetary experts from three of the United Nations, the United States, Great Britain and Canada, are the first to have publicly presented plans for establishing monetary stabilization. The respective Governments are not committed to the proposals, which are merely presented for discussion. Since all three are essentially based on gold, they offer encouragement to the hard pressed gold mining industry.

The proposal by American technical experts (White plan) would set up an international stabilization fund amounting to the equivalent of \$5,000,000,000. The name selected for the monetary unit is the "Unita," consisting of 137½ grains of fine gold (equivalent to \$10 U. S.). Under the latest version, a country desiring to join the fund would make an initial payment of 50 percent of its quota in gold. The U. S. proposal states that a charge shall be levied in gold against any member country "selling its abnormal war balances and against the country in which the balances are held." Other charges on various transactions are also to be paid in gold.

The British proposal (Keynes plan) is to establish an international clearing union "based on international bank-money called bancor, fixed (but not unalterably) in terms of gold by the British Commonwealth and the United States and all other members of the Union for the purpose of settling international (trade) balances." The British plan supplants gold as a governing factor in the Clearing Union but does not intend to dispense with it. Their proposal, however, states "the fact that a member state is entitled to obtain a credit in terms of bancor by paying actual gold to the credit of its clearing account, secures a steady and ascertained purchaser for the output of the gold producing countries, and for countries holding a large reserve of gold. Thus the position of producers and holders of gold is not affected adversely, and is, indeed, improved."

On July 12, Canadian monetary experts announced their observations on post-war monetary organization and christened their proposal International Exchange Union, with an aggregate fund of \$8,000,000,000. The name selected was the Unit, consisting of 137½ grains fine gold, whose value in terms of gold could not be changed without the approval of four-fifths of the member vote. Under the Cana-

dian proposal each member country shall pay 15 percent of its quota in gold and the balance in national currencies. Among the powers of the Union they propose that "the Union shall have the power to buy, sell and hold gold, currencies, and government securities of member countries."

In August, Secretary Morgenthau announced a revised version of our international stabilization proposal which essentially is the same as the first proposal, but which stresses the importance of gold (50 percent payment in gold) as a basis for international currency stabilization. Some details in the original White plan were changed, however, following discussion with representatives of nearly 30 prospective member countries. The latest plan also allows payment of three-eighths contribution in gold by countries occupied by the enemy.

It is reasonable to assume from these tentative proposals that when reconstruction and rehabilitation of virtually every country in the world gets under way, gold mining will once again be revived.

Though the Soviet Union has not announced its position in any plan for post-war monetary stabilization, it is significant that reliable reports indicate that production of gold from the rich deposits in the Far Eastern Republics has been maintained during the war period.

Let's Keep Our Fingers Crossed

WHILE our military forces continue to make gains on the fighting fronts, events at home give cause for stopping a moment to consider the progress of war production.

According to the latest report by Chairman Donald Nelson of the War Production Board, munitions output increased only 3 percent in July. Our monthly war production goals are not being achieved according to plan, though apparently the overall results are nevertheless considered satisfactory. Mr. Nelson also explained that the War Production Board now has data to determine, within narrow limits, the volume of raw materials available and stated that the supply of certain critical materials has improved so as to permit small surpluses.

Every member of the mining industry has worked hard to contribute his share to make such a report possible, but it would be prudent and wise for all concerned to "keep their fingers crossed" that this apparent improved position is going to be maintained from now until the end of the war. The public has taken comfort from the headlines reporting victories, and the charge has been made that complacency has retarded war production. The record admittedly has not been according to plan, and is apparently only satisfactory as far as the nearby position is concerned. But when we know that "Fortress Europe" must be smashed with an avalanche of everything we've got, and also realize that we have traveled only a short distance on the road to Tokio, it is time to shake off complacency. Maximum output of all mineral products and critical materials must be maintained for production of planes, ships, guns and ammunition to "Back the Attack." We cannot uncross our fingers and be complacent about any part of the supply situation at this time. Total victory will not be found in the nearby position so many seem to believe.

Beehive Coke Industry Revived*

Although contributing only 10 percent of the total coke requirements of this country, beehive coke is a most important source of blast-furnace fuel for our wartime steel program. The beehive oven, long ago abandoned as obsolete, has in some ways proved to be a savior of steel expansion

WITHOUT question, beehive coking was a dead industry. Almost everybody now believes that, as soon as the war boom is over, beehive coke will go out of existence completely. It is possible, of course, that some small blast-furnace business may still be available and some foundry needs will have to be served, but as an important source of coke the beehives are "living on borrowed time."

During the years just before the defense program, it apparently was the policy of the steel companies to provide for their coke needs at byproduct plants to the extent of 80 percent of capacity requirements. When the need for steel was increased by defense requirements, the steel companies, in conjunction with the Government, began building new byproduct plants. Because of the special needs of such plants and the time and materials required to erect, preheat, and bring them into production, much time was saved by turning to the beehives for furnace coke. Not only did the expanded steel program require more coke for the blast furnaces, but the amount of coke per ton of pig iron

increased, placing greater demands on all coke plants.

Beehive-coke production advanced in rather miraculous fashion from less than 1,000,000 tons in 1938 to more than 8,000,000 tons in 1942. This great advance in production in the face of shortages in manpower and material is very worth while reviewing.

Beehive coke has been manufactured in 24 states of this country and at present is being made in 7 states. Pennsylvania, pioneer in the art, leads all other states in beehive production. Beehive coke in this country really dates from 1859, when 30 ovens were built by the Fayette Coke Works near Connellsville, Pa. In 1913, there were 575 coke-making establishments in the United States, distributed among 24 different states. Over 100,000 beehive ovens were then in existence.

From early times the loss of the volatile products of coal in beehive ovens was known to be wasteful. The many advantages of the byproduct ovens, with their recovery of valuable coal tars, oils and gases, led to gradual decline of the beehives after the last World War. But in every instance, when quick production was required, beehive coke was readily obtainable. Beehive plants followed the



By J. A. KELLEY

Associate Mining Engineer
Central Experiment Station, Bureau of Mines
Pittsburgh, Pa.

coal fields and with few exceptions were located at the coal mines. By-product plants are located with respect to markets for the coke and its byproducts. The coal is hauled from mines by river or rail, making it possible for byproduct ovens to deliver a tailor-made commodity, but beehive ovens produce coke only as good or bad as the coal from the mine serving them.

Perhaps it is worth while to review the principle and construction of beehive ovens. First, it should be noted that the beehive district includes two different types of ovens—the first the real beehive, shaped like a beehive and somewhat resembling an inverted coffee cup. The second type is a horizontal oven, rectangular in shape and known as the push-type oven. The rectangular is an improvement over the old beehive, providing higher capacity per oven and cheaper operation.

The principle of both beehive and horizontal ovens is the same. In effect, they act as retorts. The ovens are

* Published by permission of the Director, Bureau of Mines, U. S. Department of Interior.



Before—View of beehive coke oven rehabilitation

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After—Rehabilitation completed, ovens ready for production of coke

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"fired up" by building fires inside the ovens to heat the walls. When the coal is charged, this residual heat drives off the volatile matter in the coal, which is ignited and burned inside the crown or uppermost part of the oven. In other words, the coal provides heat for its own carbonization. This process is accomplished by careful attention to the control of air, which is admitted over the top of the oven doors to unite with the combustible coal gas. The coke is quenched within the ovens in both horizontal and beehive types. Some beehive plants utilize a Stauf rotary spray instead of a long water pipe for quenching. With the spray, one man can water three or four ovens at once. The beehive-oven plants can be found divided into two classes, those in which the coke is drawn out by hand and those in which it is drawn out by machine.

Hand-drawn ovens at present are averaging about $3\frac{1}{2}$ to $4\frac{1}{4}$ tons of coke per oven drawn and machine plants $4\frac{1}{2}$ to 5 tons per oven drawn. Horizontal ovens get yields up to 8 tons per oven drawn. On a monthly capacity basis, beehives produce 50 to 60 tons and horizontal ovens 60 to 70 tons of coke per month. The operating schedules call for four days of 48-hour charges and two days of 72-hour charges.

What might be called a typical coke plant of the old days consisted of a large capacity coal bin to serve as standby in event of break-downs in the mine, a coke plant, a power plant, and a reservoir for water storage. Freshly mined coal was charged into the ovens and leveled by hand, although some machines have been built for this purpose. The door was sealed and the coal allowed to coke. The coke burner, whose job was to control the air admitted over the door, practically lived on the coke yard. During rainy and windy weather, he got up at night

to watch the ovens. This careful attention explained the good results obtained from beehive coke.

The advent of byproduct ovens slowly but surely forced the beehive plants out of business. Some foundry coke was sold for blast furnaces. Very little coke was produced. Some of the factors that accounted for this change are (1) the beehive product was extremely nonuniform in quality, (2) the process was wasteful, and (3) markets for the breeze, tars, and oils made the byproduct plants economically advantageous. Under these limiting conditions, beehive plants were forced to close. All over the country the remnants of a once great industry crumbled into ruins. The sky, formerly glowing from the oven fires, which were visible for miles, cleared again.

The men who had built the plants and kept them in repair found work elsewhere. Those who operated the machinery also sought new employment, and much of the machinery was scrapped. Railroad sidings were torn up, and some of the oven stone was used for building houses and retaining walls. Coal mines that supplied coke plants were abandoned, or the coal was sold in other markets. There seemed no longer to be any hope for revival of the beehives, and after a few years only a few scattered ovens produced coke. The other ovens disintegrated and fell apart.

When the defense program was inaugurated and preparations made to increase pig-iron output, blast-furnace operators looked to the beehives again. Local investors, realizing that the boom would last only a short time, poured some money into the rehabilitation of additional ovens. Of course, the best ovens were rebuilt first. Many needed only masonry work on the front walls and patches on the oven walls. Wherever larry cars and steel rails

were available, they were installed to charge the ovens. Used coke-drawing machines were purchased and rebuilt. The availability of some machines and the better condition of some ovens that were first rehabilitated provided incentives for the men financing the project to rebuild additional ovens and provide for greater production. As defense gave way to war, the demand for coke increased. This meant that ovens whose condition was less favorable had to be rebuilt. In many instances, it meant completely rebuilding some of the ovens from the bottom. Some of the early ovens were rehabilitated for as little as \$25, but as the requirements for rehabilitation and materials increased, the cost to rebuild an oven now is nearly \$1,000. The hand-drawn plants where very little machinery is needed can be rehabilitated at virtually the cost of repairing the ovens.

As machinery grew scarce and labor difficult to get, operators resorted to means for eliminating some of the usual or standard coke-plant appliances. Larry cars were eliminated by substituting trucks for charging the ovens. At one plant where electricity is not available, a horse draws the larry car along the ovens. The use of trucks meant that it was necessary to have a bin at the coke plant unless the mine was so equipped. Thus some coke plants do not have even a bin for coal storage.

Because it would be too costly to regrade and rebuild railroad sidings at some plants, the coke after drawing is delivered into trucks to be hauled to a siding some distance away. Even the cleaning and carting of ashes have been refined. Tractors equipped with high lifts are used to pick up the ashes and load them into the trucks. This is very different from the old days, when mules or horses drew carts hauling the ashes to dumps.



Location of beehive plants that produced coke in 1942

Even reservoirs, which had been drained in some cases, were allowed to refill, but ordinarily city water was available, and most of the water for coke plants is now purchased. Brickmakers were swamped with orders for high-silica brick and floor tile to supply the needs of the rebuilding program. When shipments of brick ran short, some operators sought out old plants for the brick and trunnel rings and jams that were still usable.

Manpower to rebuild ovens, draw coke, and operate the machinery soon began to be a problem. Coke burners and machine runners became harder to get than coke drawers. The lack of skilled supervisors and experienced men accounts in a large measure for the poor-quality coke being made at some of the plants. At one of them a 21-year old is yard foreman. The general poor supervision at certain plants is also due to plant owners' lack of real practical knowledge. Many of the men in the coke business are willing to take the profits but unwilling to make a detailed study of methods of improving the operation. The problem of supplying the coke plants with good coking coal proved to be the most difficult of all the problems besetting this boom industry. As mentioned before, many of the coal mines had been

hopelessly abandoned or completely worked out.

Modern Equipment Speeds Coal Supply to Coke Ovens

The phenomenal increase in coke production was accompanied by an equally phenomenal rise in coal production to supply the ovens. Some of the largest, best-equipped plants were entirely without adequate coal supply. The largest coal-land owner is providing leases wherever possible to operators of coke plants so that they may take care of their own coal needs. Many of the acreages available were under water, and large capacity, deep-well pumps were utilized to dewater the mines. Of particular interest is a mine of approximately 650 acres of coal that was under water. After dewatering, the operators began stripping at the outcrop and later made two mines out of the property so that they have been able to supply not only their own needs but coal for another coke plant.

Coal-mine operators began to talk in terms of $\frac{1}{4}$ -acre tracts. From a conservation standpoint the local boom has been beneficial because many tracts of coal too small to be operated profitably in normal times have been developed and the coal removed. In some instances many thousands of tons

of coal long abandoned and written off the record have been recovered. There have been examples of driving hundreds of feet through solid gob to recover lost coal.

The improvement in equipment for open-pit stripping of coal may be held accountable in some part of the quick increase in production of both coal and coke. This high-tonnage per-man equipment allowed operators to produce coal at lower costs than those for deep mining and thus show a profit in the financial column. With this profit they were able to change over to deep mining and continue production. All this required machinery. Draglines were introduced into this field and proved very successful. With these came other earth-moving equipment, scrapers, power shovels and bulldozers. Large-capacity trucks were added to the equipment list for hauling coal to the coke plant.

The reopening of underground mines called for more men and more machinery. Physical requirements were lowered to permit older men to work. Abandoned properties were secured and used-machinery houses searched for mining machines, hoists, mine cars, rails, locomotives and other electrical equipment. Where electricity proved to be costly, gasoline-driven hoists were installed. Old-type composite

cars were rebuilt for service, and some wooden rails were used where steel ones were not available. Many old steam-powered plants were electrified. Gasoline-driven mine fans are a common sight. Every known and conceivable appliance and method were used to increase coal production. Coke-plant operators spoke of their coal supply in terms of 25 to 30 tons per day from certain mines and only for a few months. One coke plant is now being served with coal from 24 mines in four different seams.

Where the supply from the standard seams of good coking coal was short, mines in other less desirable, inferior seams were opened. The use of these inferior coals has resulted in a generally inferior quality of coke, high in ash and sulphur. To care for the varying character of the coal, some coke plants have installed blending systems to make a uniform-quality product. One plant has a continuous mixing arrangement, which is very satisfactory and gives good results.

The high ash and high sulphur in beehive coke have definite bad effects on iron production. It has been determined that for every 1 percent increase in ash in the coke, iron production is cut 5 to 6 percent. These effects are even more pronounced when we consider that coke ranges in ash content from 8 to 18 percent and that the use of such a nonuniform fuel makes it necessary for blast-furnace operators to set this charge for the high-ash coke. In other words, in some instances, they cannot take advantage of the low-ash coke. This effect on iron production is noteworthy.

Trucks Play Important Part in Haulage of Coal to Ovens

As only a few plants have coal available in mines at the plant site, it became necessary to haul the coal supply by truck or railroad. The use of trucks for hauling coal to beehive ovens is perhaps the most significant feature of the present beehive industry. More than 85 percent of the coal shipped into the ovens is hauled by truck. Transportation of these ponderous quantities of fuel has become a real problem. Some trucks haul as much as 150 tons of coal per day every day. The almost total lack of new trucks has made it necessary for the truckers to rebuild some of their equipment completely. Few of the trucks are 1942 models and any older than last year's model will be subject to frequent break-downs. Eight of one operator's 10 trucks were broken down at one time. Repair parts are difficult to get, and mechanics to make repairs are overworked. These conditions result in considerable loss of time and even in loss of production. Requirements for tires and gasoline are tremendous, and fear for the supply of truck tires is growing.

The passage of large trucks filled

with coal has played havoc with roads that were not laid for such heavy traffic. Winter's ice and snow and alternate freezing and thawing make some of the roads impassable. The cost of repairing and maintaining such roads has become a major problem for some townships and boroughs.

Railroad shipments of coal to coke plants are a most desirable form of transportation because the railroads have to push an empty car into the coke plant, so why not push a loaded car of coal? However this may seem on the surface, the problem of rail shipments is very complicated. Some plants have no unloading facilities and cannot install any without extraordinary expense. Small-capacity plants cannot spend much money. Then the railroad cannot compete with truck transportation where the hauling is less than 7 miles. For greater distances, the railroad is a cheaper form of transportation, but the cost of the delivered coal is prohibitive under present coke ceilings.

However, as the nearby supply of coal for coke plants is exhausted, we will have to reach out to mines farther away. This can only mean wholesale revision of the present system or rehabilitation of ovens in other areas, a course that may be entirely possible if the demands of the war program advance.

Engineers Aid Small Coke Producers

To assist beehive operators in their genuine effort to produce fuel of good quality the Federal Bureau of Mines recruited a crew of field engineers and equipped a special mobile laboratory—the only one of its kind in the world. The laboratory is equipped with instruments for measuring oven temperatures, sampling and analyzing exit

gases, and making float-and-sink tests for refuse in coal. In the absence of trustworthy technical data on the operation of beehive ovens, the field engineers spent a few weeks at a large, well-operated plant, studying operating details. It has been proposed that the preliminary study of beehive coke ovens made by these field engineers should be published in the near future. Float-and-sink tests soon interested oven operators; some have made efforts to clean their coal, and at least one operator is installing a small washer to improve his product.

Experience in the field quickly revealed that many needs of the industry were not entirely technical and that assistance from other Government agencies in procuring equipment and coal supply was also necessary. In close cooperation with Harlen M. Chapman, Assistant Deputy, Solid Fuels Administrator for War, and Samuel Weiss, Chief of the Fuel Section, War Production Board, the engineers of the Coke Production Survey have been able to assist operators to assure themselves of a coal supply and to anticipate and provide other needs.

To the men who rebuilt this dead industry goes a debt of deep gratitude from a nation hard-pressed for steel. Without assistance from the Government until recent months, many of them risked their lives in mines and coke plants that formerly no one wanted. Although it is true that this industry probably will last only until the war is ended, its members are rendering a distinctly valuable service in the war.

Substantial beehive-coke production can be assured for about 1 year or more; after that, unless we begin planning additional coal production, the total beehive-coke output will fall short of requirements.



Interior view of Bureau of Mines mobile laboratory



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Leg wires connected to "short-circuited" bus wires in an Arizona copper mine

Safety in Underground Blasting Methods*

Proper equipment and knowledge of correct procedures are extremely important in explosives practice, but responsibility for the elimination of blasting accidents rests with the foreman as well as the miner

By B. S. RICHARDS

Superintendent, Zenith Mine
Pickands Mather & Company, Ely, Minn.

IT IS RECOGNIZED that blasting accidents can generally be traced to violations of the well-known and standard safety practices. In view of these facts, it would seem unnecessary to deal with the problem of the handling and use of explosives were it not for two factors: First, explosives accidents are continuing and second, the Federal Explosives Act has necessitated changes in our standard explosives practices, some of which are, and will probably remain, controversial.

Delivery and Transportation of Explosives to Main Magazines

In general, the transportation of explosives from the collar of the shaft to the mine storage magazine has improved to the point where accidents in the course of this operation are very rare.

Two factors influence the quantity of explosives which shall be taken underground at any one time. One consideration demands that the quantity shall be as small as possible so that at no time will there be an excess of explosives stored underground. The other consideration requires that as little time as possible shall be spent in transporting the explosives. The last consideration infers that an adequate quantity of explosives shall be transported and stored underground at one time so that the number of trips may be reduced to the absolute minimum. In balancing these two considerations it appears that the transportation of explosives underground on a daily basis is undesirable because of exposure, and transporting underground once a week is equally undesirable because of the quantity carried in the main magazine. In view of these facts, most mines are transporting explosives to underground magazines twice or three times a week which seems a reasonably good practice. Some operations, however, may necessitate delivery on a daily basis in order that the quantity stored in the main magazine may be held within reasonable limits.

* Presented at the June 17 meeting in Duluth, Minn., of the Mine Safety Conference of the Lake Superior Mining Section, N. S. C.

It is understood that there should be no delay during the period of transportation, and that the vehicles for bringing the powder from the unloading point on surface to the underground magazines should be properly constructed and maintained.

Conditions under which explosives should be stored are also well-known. New explosives and detonator magazines are now generally being located, designed and constructed in accordance with the requirements of the Federal Explosives Act; however, it is necessary to make allowances for the practicable distances between such magazines, the shafts and active working places. Underground magazines should be dry and well ventilated, but it is probable that even under adverse conditions of storage, little harm may result, since the period of exposure to such conditions is relatively short.

It should be pointed out, however, that improper storage may lead to misfires or incomplete detonation with their attendant hazards. Explosives should be stored in a manner to permit the use of old explosives first. The detonator magazine should be located at least 25 ft. from the powder magazine and it is not desirable to store any tools or other material in these magazines. Under most conditions, properly designed and protected electrical heaters should be installed in detonator magazines to insure the keeping of fuse in a dry condition.

The method of issuing and accounting for explosives, with some exceptions, is generally believed to be in accordance with the requirements of the Federal Explosives Act. Transporting of explosives from underground magazines to the working places should be in weather-proofed bags or other approved containers. Capped fuse should be placed in rigid, insulated containers for the transportation to the working places. It is also desirable to issue only one shift's supply of explosives and capped fuse at any one time and that they should be carried to the working place by the miner or some one designated by the foreman.

Storage of Explosives at the Working Place

It is generally agreed that explosives should remain in the working place no longer than absolutely necessary. Thus, if mining conditions permit, the explosives should be obtained just before needed. In many mines, however, it is impracticable to obtain the explosives from the main magazines shortly before required since some mining operations necessitate more or less continuous blasting. The time required for transportation of explosives under these conditions make it thoroughly impracticable. To allow

the explosives to remain in the working place at any point selected by the miner is also undesirable, and a safe storage place for explosives should, therefore, be provided. This can be accomplished through the use of suitable wooden storage boxes. It might be well, however, to mention that explosives could be kept in the weather-proofed bags used in transporting the explosives from the magazine provided they are delivered a reasonably short time before needed.

The Federal Explosives Act requires that all unused explosives and capped fuse be returned to the magazine at the end of the shift. This appears impracticable on a multiple shift basis since the shifts change in the working places. It introduces unnecessary handling which all good procedures seek to avoid, and would also encourage the hiding of explosives in the working place, which is a very dangerous practice.

Up to this point, accidents from explosives are relatively rare, indicating that the hazard is small or that it has long been a custom to follow safe methods.

However, our *actual use* of explosives is very vulnerable as indicated by the accident records, which show that nearly all explosives accidents are confined to this phase of the operation.

Fuse Specifications and Proper Methods for Preparing Primers

A fuse should be selected which has adequate moisture resisting properties, and a burning speed of approximately 1 ft. in 40 seconds or 1½ ft. per minute. The fuse should be cut in lengths which will leave at least 6 ft. remaining after the maximum trimming necessary for the proper rotation of holes. However, for secondary blasting when only single shots are



A neat fuse cutting room underground in a Michigan iron mine



A fuse and explosives magazine. The fuse room is separated from explosives room by a concrete wall and a steel door in this Wisconsin iron mine

fired, fuse may be cut to a minimum of 4 ft. Cutting of the fuse and attaching of the cap should be done in the detonator magazine by one man using approved equipment. The capped fuse should have a string attached to the fuse about 1 in. above the detonator for tying the fuse to the primer cartridge.

Properly made primers are very important because poorly made primers may readily cause a blasting accident during the loading operation even though proper care is being exercised when inserting the primer in the blast hole. Improperly made primers have resulted in premature explosions causing serious accidents. The safest primer is one in which the cap is inserted in the center of the cartridge parallel to the long axis of the cartridge. The poorest primer is one in which the base of the cap is near the outside of the cartridge where it is likely to break through the wrapping if tamped too hard or come in contact with some sharp obstruction in the hole while loading, causing a premature explosion. Misfires may also result from improperly made primers.

It is suggested that primers be prepared by punching a hole length-wise in the side of the cartridge with a wooden or copper punch $1\frac{1}{2}$ in. from the end of the cartridge. Punching must be carefully done to insure that the detonator will be located in the cartridge as previously described. The detonator should be inserted in the hole to the depth of the string on the fuse and then tied to the cartridge in that position. For additional protection of the detonator, the primer is frequently placed in a cardboard tube. If the above procedure is followed, and proper care is exercised in placing the primer in the hole, it is reasonable to assume that blasting accidents may be eliminated during the loading operation.

Dynamite primers are supposed to be the most effective when the "business end" of the detonator is pointing toward the bulk of the charge, which means that in order to secure the most effective results, the primer should be the last cartridge placed in the hole. However, in rotation blasting where all charges do not fire simultaneously, this step would introduce a serious hazard since the primer might be dislodged and buried in the muck pile by the detonation of an adjoining hole; consequently, primers should always be placed at, or near, the bottom of the hole.

Loading a round of holes is hazardous if carelessly done, particularly the placing of the primer in the hole. The primer should be the second cartridge from the bottom—the one unprimed cartridge in the bottom serving to cushion the primer from contact with the back of the hole. The primer



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Repairing the primer for blasting a round in an iron mine, Minnesota

should be lightly pressed into place without forcing or tamping. Accidents have occurred as result of attempting to force the primer into position even though the primer was properly made and the cartridge protected by using a cardboard tube. The cartridge following the primer should be tamped only lightly but the remaining cartridge should be firmly tamped into place. Each cartridge should be loaded and tamped singly since when several cartridges are placed in the hole and pressed into position at one time, the last cartridge breaks up in the proper manner but those beyond will buckle in such a manner as to leave considerable air space.

The fuse must be long enough to project at least 6 in. from the collar of the hole after the fuse has been trimmed for proper rotation of holes. When lengths exceeding a foot or so extend from the hole, they should be coiled to prevent their spitting into a nearby hole, and also to facilitate lighting. It is very important that the fuse extend the required distance beyond the collar of the hole, not only because it is extremely difficult to light a fuse that extends to the face of the breast but should the fuse fail to light immediately, it is nearly impossible to recut the fuse without undue delay.

Only wooden tamping sticks with squared ends should be used; however, it may be necessary that one end be sharpened or equipped with a wooden skewer, or some other means be provided, for attaching the cartridge to the tamping stick for loading holes out of reach, or for guiding cartridges into holes whose sides are so rough that they cannot otherwise be properly loaded.

The use of stemming is recom-

mended if readily available. In underground ore mining it frequently involves some added expense and effort, so that any increase in efficiency may be nullified. Blasting can be safely done without stemming provided that the previously mentioned precautions are followed to prevent fuse spitting into an adjacent hole.

The time element is of the greatest importance when lighting the fuse and it is, therefore, essential that the lighting be done in such a manner that the men may leave the place as quickly as possible. A few preliminary steps will help to limit the time required. First, all tools and other equipment should be removed to a place of safety. The fuse should be trimmed so that there need be no hesitation in the lighting of the fuse to secure proper rotation. The proper firing order should not be obtained by allowing intervals between the lighting of individual fuse. Fuse may be lighted properly in numerous ways, but regardless of the method used the ends should be freshly cut and clean. Fuse may be prepared in several ways for lighting but in dry mines the safest lighting can be done if the fuse is slit for about $\frac{1}{2}$ in. so as to expose the powder train. In wet mines this is not satisfactory and other methods are more suitable.

Some operators in the Lake Superior District have forbidden the cutting of any fuse by the miners; nevertheless, this practice has a certain definite advantage in that it permits rapid lighting of fuse without the loss of rotation firing. When this rotation is secured by allowing time intervals between the lighting of individual fuse, considerable time may elapse before the lighting is completed where

a large number of holes are fired. In firing a round of 28 holes, 8-ft. fuse should be used in order that 2 ft. may be cut from the fuse in the hole which is to detonate first, 1 ft. 11 $\frac{1}{4}$ in. from the hole which is to detonate second, and so on, so that each successive fuse is about $\frac{1}{4}$ in. longer than the one preceding it. In firing a round of 12 to 16 holes in a soft ore heading, 7-ft. fuse may be used, cutting 1 ft. from the fuse in the hole which is to detonate first and then proceeding in the same manner as above described. When the fuse has been trimmed as outlined, lighting can be rapidly done in the same sequence and rotation assured. With this system, it has been found possible to light a round of 28 holes in 30 to 40 seconds, and secure perfect rotation. The amount to trim depends upon the number of holes but in no case should the shortest fuse be less than 6 ft. after trimming.

When using 6-ft. fuse, lighting should be stopped and the men leave the working place within 100 seconds, which is the maximum burning time of a 9-in. hot wire lighter. If the maximum fuse length after trimming is 7 or more ft. instead of 6 ft., the period allowed may be increased accordingly. At least two men should be present during the lighting operation and care must also be taken to guard the entrances to the working place after the fuse has been lighted. The above precaution should eliminate accidents from premature blasting with fuse.

Statistics show that blasting accidents in the working places are about equally divided between those caused by premature blasts and those caused by misfires. The handling of misfires, therefore, requires extreme care. They should be disposed of by inserting a new primer in the misfired hole and reshooting. If necessary, the hole may be washed out with water to facilitate the placing of the new primer, but if conditions require other means of disposal, they should be carried on only under the direct supervision of the foreman.

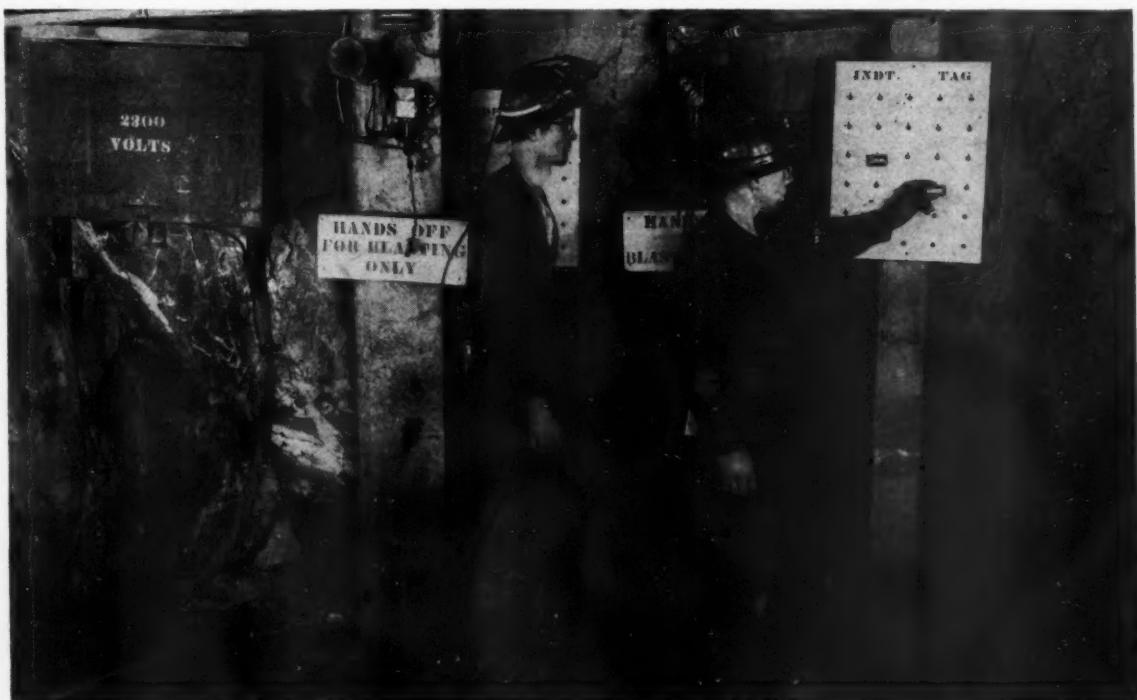
Electrical Blasting

Electrical blasting should be used in sinking operations, raises over 50 ft. high, and in large development drifts where an excess number of holes is to be fired, or it is necessary for men to walk a considerable distance to a place of safety. Primers made with electrical detonators can be prepared by punching a horizontal hole in the cartridge near one end, pulling the detonator through the hole and inserting it in a longitudinal hole punched in the opposite end of the cartridge. The primer should be the second cartridge from the bottom with the "business end" of the detonator pointed toward the bulk of the explosives charge. The same care should be exercised in loading the holes using electric detonators as when using capped fuse. Parallel connections should be

used, as it permits checking the hook-up more readily and a closed circuit should be maintained at all times during the loading operation, or until ready to do the actual firing. The use of instantaneous and delay detonators is not recommended in the same circuit. In both cases, primers should be made up as near the face as practicable to avoid the danger of transporting live primers.

Conclusion

Unquestionably, accidents resulting from the handling and use of explosives can be eliminated. However, to bring about this safety will require the expenditure of much personal time and effort on the part of the underground foreman. It is not enough to set up proper methods and then forget about them for the most part, assuming that the miners have been informed as to proper procedure and practice and will not deviate from the methods outlined. Unless the underground foreman constantly checks this part of the operation, you can be sure that someone at some time will deviate in a dangerous manner from safe practice. Let this deviation continue and in due time an accident will be the natural result. Supervision, therefore, is very important and if properly exercised, it will, together with the use of the right equipment and correct procedure, completely eliminate blasting accidents in underground mining.



Checking up on the whereabouts of miners before blasting

-- BUREAU OF MINES

Floating Chalcopyrite From Galena and Sphalerite

A summary of the method developed at a large lead-zinc concentrator south of the border

By THE MILL STAFF
San Francisco Mines of Mexico, Ltd.

Foreword—The scheme, as described here, for floating chalcopyrite from galena and sphalerite in a general lead flotation concentrate, was developed at the San Francisco Mines of Mexico, San Francisco del Oro, Chihuahua, Mexico, after it had been established that the ordinary methods of depressing chalcopyrite and floating galena were not effective on Frisco ore. The scheme may or may not be new. We had the thought, however, that a short description of it might be of interest to others who may be faced with a similar problem.

CONSIDERABLE laboratory work had been done from time to time, but results were never conclusive, and enthusiasm to include a copper section in the mill never high. However, as the copper in the mine ore seemed to hold consistently above 0.7 percent and all laboratory work had pointed to this figure as being about the breaking point above which it would be profitable to make and market a copper concentrate, and, as a stable market price for copper seemed to be assured for the time being, work was again started, this time from a somewhat different angle—that of floating the chalcopyrite and depressing the galena and sphalerite.

The chalcopyrite float to constitute the copper concentrate, and the tailings of the section, containing the galena and what sphalerite it may carry, to constitute the final lead flotation concentrate.

The scheme as developed gave promise, so much so, that a copper section was built in the mill to treat the general lead flotation concentrate, about 160 metric tons a day.

General Steps in the Process

No attempt will be made to describe in detail the steps which lead up to the completed operation.

In general the scheme consists of:

- Thickening the general lead flotation concentrate, in part to de-

water, and in part to provide a steady feed.

- Agitating the thickened pulp in a sulphurous acid solution, pH about 3.0. Zinc hydrosulphite and a starch solution are added here also.
- Treating the pulp from (2) above with lime in an agitator to a pH of 6.0 to 6.5.
- Floating for rougher and clearer concentrate in modified M. S. cells.

For producing the sulphurous acid, sulphur is buried to SO_2 gas in a horizontal burner equipped with combustion chamber. The gas is led to a tower filled with coke through which water is sprayed. The absorption is almost perfect, and the SO_2 in solution is drained off through a water seal at the bottom.

For the starch solution, commercial starch is digested with water, under

steam pressure in an apparatus which had been used for making solution of sodium silicate.

Reagents used are—per ton mine ore treated:

Sulphur	0.23	kilos
Zinc hydrosulphite	0.05	"
Lime	0.27	"
Starch	0.04	"
Amyl alcohol—small and as frother.		
Xanthate Z3—very small amount at times.		

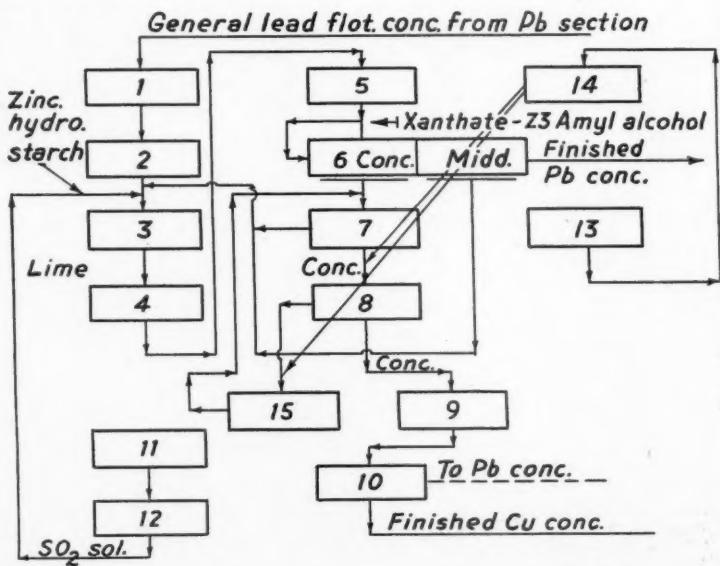
The accompanying flow-sheet will give an idea of the section lay-out with other points of interest.

No attempt is made in this short description to present a balanced metallurgy; however, the following is typical of results being secured at present:

	Pb	Zn	Cu
Feed to copper section	54.60	6.94	8.5
Cu concentrate	6.01	5.52	27.69
Pb concentrate (cu tail)	66.0	7.10	2.8
Pb table concentrate	65.1	6.40	1.0

Great credit should go to T. R. Herndon, mill superintendent; Geo. Harris, experimental metallurgist, and the foreign staff in the mill, for their efforts in developing this from an idea to an actuality.

For permission to publish this general outline we are indebted to Henry B. Hanson, general manager of San Francisco Mines of Mexico.



- 1—4-in. Wilfley pump
- 2—30 x 10-ft. Dorr thickener
- 3—8-cell 18-in. Mineral Separation flotation machine used as agitator. Low level, no air
- 4—4-in. Wilfley pump
- 5—8 x 10-ft. agitating tank
- 6—4-cell 24-in. Mineral Separation flotation machine—Rougher
- 7—1-cell 24-in. Mineral Separation flotation machine—Cleaner
- 8—1-cell 18-in. Mineral Separation flotation machine—Cleaner
- 9—2-in. Wilfley pump
- 10—1 Diester table as pilot
- 11—Sulphur burner
- 12—Absorption tower
- 13—Starch digester
- 14—Starch stock tank
- 15—2-in. Wilfley pump

Permissible Mine Equipment Approved During 1942*

A LIST of permissible mine equipment, tested and approved previous to January 1, 1942, was published in Bureau of Mines Information Circular 7207.[†] The present list covers additional equipment approved during the calendar year 1942. The items have been numbered to indicate the order in which each type of machine or device was approved in its particular classification. Thus, Information Circular 7207 gives four air compressors on the Bureau's active list, and the present circular gives the fifth to be approved. Items 90 and 94, under Loading Machines and Conveyors, also appear in Information Circular 7207. These numbers are repeated here to show that approval was granted during 1942 for additional voltages on machines previously listed for one voltage only.

Equipment listed in these circulars is approved by the Bureau of Mines only when found upon inspection and test to comply with minimum standards of safety as outlined in schedules prepared on the basis of many years of experience in dealing with safety problems of the coal-mining industry. The use of such equipment in mines known to be gassy, as well as in those which may become so, is earnestly recommended in the interests of safety. This circular is published so that the industry may be kept informed as to the many types of machines, devices, and lamps that are available for reducing explosion and other hazards incidental to coal mining. The present paper and Information Circular 7207 together give the complete list of all available permissible mine equipment.

Air Compressors

5. Type T-19 air compressor, two motors, 5 and 25 hp., 230 and 550 volts, D.C. Approvals 465 and 465A issued to the Sullivan Machinery Co., December 12, 1942.

Loading Machines and Conveyors

90. Type G-15 shaker conveyor; 15-hp. motor, 220 volts, A.C. Approval 384 issued to the Goodman Manufacturing Co., May 13, 1942.

94. Type 61-EW elevating conveyor; 5 hp. motor, 250 volts, D.C. Approval 391 issued to the Jeffrey Manufacturing Co., February 7, 1942.

113. Type 61-AM room conveyor; 10-hp. motor, 220 volts, A.C. Approval 444 issued to the Jeffrey Manufacturing Co., February 17, 1942.

114. (a) Type 32D5P "shuttle car" (storage battery operated); three 5-hp. motors, 90 volts, D.C. Approval 445 issued to the Joy Manufacturing Co., March 3, 1942.

(b) Type 32D6P "shuttle car" (same electrical equipment as above) included by extension of Approval 445.

115. Type 91-C-17 chain conveyor; 10-hp. motor, 230 volts, D.C. Approval 447 issued to the Goodman Manufacturing Co., April 18, 1942.

116. Type L-600 loader; 50-hp. motor, 250 and 500 volts, D.C. Approvals 448 and 448A issued to the Jeffrey Manufacturing Co., April 9, 1942.

117. Type 95-B-24 belt conveyor; 3-hp. motor, 250 volts, D.C. Approval 449 issued to the Goodman Manufacturing Co., May 9, 1942.

* Reprinted from Bureau of Mines Inf. Circ. 7240.

† Ilsley, L. C., List of Permissible Mine Equipment: Approved to January 1, 1942, Bureau of Mines Inf. Circ. 7207, 1942, 38 pp.

By E. J. GLEIM

Electrical Engineer, Bureau of Mines
Central Experiment Station
Pittsburgh, Pa.

118. Type 42D7P "shuttle car" (storage battery operated); two 7½-hp. and one 5-hp. motors, 90 volts, D.C. Approval 450 issued to the Joy Manufacturing Co., June 3, 1942.

119. Type PL11-7P elevating conveyor; 10-hp. motor, 250 and 500 volts, D.C. Approvals 452 and 452A issued to the Joy Manufacturing Co., July 7, 1942.

120. Type 61 power unit for conveyors; 5-hp. motor, 220 volts, A.C. Approval 453 issued to the Jeffrey Manufacturing Co., July 9, 1942.

121. Type 2SC-1D "shuttle car" (storage battery operated); three 5-hp. motors, 90 volts, D.C. Approval 454 issued to the Joy Manufacturing Co., July 9, 1942.

122. Type 61 power unit for conveyors; 15-hp. motor, 230 volts, D.C. Approval 455 issued to the Jeffrey Manufacturing Co., August 13, 1942.

123. Type 95-16 belt conveyor; ¾-hp. motor, 230 volts, D.C. Approval 457 issued to the Goodman Manufacturing Co., August 20, 1942.

124. Type 14BU-3PMLE loading machine; four 7½-hp. and one 4-hp. motors, 250 volts, D.C. Approval 458 issued to the Joy Manufacturing Co., September 16, 1942.

125. Type 24BB loading machine; 50-hp. motor, 210 volts, D.C. Approval 459 issued to the Clarkson Manufacturing Co., October 30, 1942.

126. Type 97-C-26 belt conveyor; 15-hp. motor, 230 volts, D.C. Approval 460 issued to the Goodman Manufacturing Co., October 30, 1942.

127. Type PL11-9 elevating conveyor; 10-hp. motor, 250 and 500 volts, D.C. Approvals 461 and 461A issued to the Joy Manufacturing Co., November 2, 1942.

128. Type 97-30 belt conveyor; 15-hp. motor, 250 volts, D.C. Approval 462 issued to the Goodman Manufacturing Co., November 3, 1942.

129. Type 11BU-7 loading machine; 50-hp. motor, 250 and 500 volts, D.C. Approvals 463 and 463A issued to the Joy Manufacturing Co., November 21, 1942.

130. Type PL11-5P elevating conveyors; 7½-hp. motors, 250 and 500 volts, D.C. Approvals 466 and 466A issued to the Joy Manufacturing Co., December 15, 1942.

131. Types G-12½ and GS-12½ shaker conveyors; 10-hp. motors, 230 and 550 volts, D.C. Approvals 467 and 467A issued to the Goodman Manufacturing Co., December 29, 1942.

Mining Machines, Mining-Machine Trucks and Machinery-Moving Units

94. Type T1-3P mining-machine truck; two 4-hp. motors, 250 and 500 volts, D.C. Approvals 443 and 443A issued to the Joy Manufacturing Co., February 14, 1942.

95. Type T4-2P caterpillar tractor (machinery moving unit); two 4-hp. motors, 250 and 500 volts, D.C. Approvals 451 and 451A issued to the Joy Manufacturing Co., June 23, 1942.

(Continued on page 65)

Preparation of Coal from the Enos Strip Mine

Production of a uniform product from open pit coal mines can be achieved by careful supervision of blasting, loading, transporting and cleaning practices

COAL MINES in southwestern Indiana which employ mechanical means to remove the overburden that lies above the No. 5 Seam have been in operation between 25 and 30 years. The power shovels and other machines used in the removal of the material above the seam have been from the smallest steam or gas shovel to the most modern and up-to-date electric shovel. These various types of equipment for the production of coal have attracted almost every kind and type of personality for the operation of the mines.

On the part of the open pit mine operators, there have been two extreme views concerning the mining operation, prerequisite to preparing the coal for market. First, we have the producer who simply believes in stripping and loading the coal with as little care and attention as possible, paying attention entirely to least production cost, and selling his product to customers who care very little about the quality, so long as it can be bought on price. This type of producer usually has small acreage, ekes out a meager living, and intends to stay in business only a very short time. Second, we have the operator who founds a substantial company, invests liberally in large acreage and stripping equipment, and has every intention of becoming a fixed and permanent industry that will be of use and service to the public in general. He also builds a cleaning and classifying plant, with which he intends from its flexibility to not only take care of his immediate needs for quality and uniformity, but he also tries to incorporate in it ideas that will enable him to anticipate future requirements which are induced by market changes.

Operators and sales forces producing and selling coal produced from open-pit mines have heard the statement time and time again about low-quality coal. In the early days of strip operation, this was probably more or less true. Pioneers of any

By WM. L. CALER
Preparation Manager
Enos Coal Mining Company

industry always have had these comments to contend with; however, by continued and tireless efforts they have improved the quality of their product to such an extent that they have succeeded, over a period of time, and with years of experience, to establish themselves as essential and potential producers of a well-prepared product. The same thing holds true with the open-pit mining industry.

To cite an instance from the writer's experience: A number of years ago when I was a railroad fuel inspector, one company started loading coal without any means whatsoever of preparing their product. They had the mistaken idea that coal could be loaded direct into railroad cars and sold to their customers without any preparation or cleaning. This method would require a minimum production cost, and would enable them to market the coal entirely on a cost-plus basis. This company loaded 25 cars from the

coal seam direct into railroad cars. Every engine which received coal loaded in this manner had a very serious failure. I wish to add, the company that loaded these 25 cars, today has one of the most modern preparation plants, and is a firm believer in a well-prepared product. Their salesmen can now sell the coal with reasonable assurance that the coal will be delivered up to the standards they set when they made the sale, even before the coal is loaded.

The Enos Coal Mining Company, "Enos Mine," is located in south central Indiana, and operates Indiana No. 5 seam. They have two types of stripping equipment, the dipper type shovel and dragline.

Liquid Oxygen Used to Blast Overburden

In preparing the overburden above the coal for removal, it is necessary that the various strata of rock and shale be broken in such a manner that it will be possible for the stripping shovel to remove the material speedily and economically. The size and in-



A large capacity electric driven shovel removes the overburden

tensity of the shot is predetermined by engineers, who estimate the amount of explosives to be used, and they, in turn, are governed entirely by the depth and type of material to be handled. In our case the explosive agent used is liquid oxygen, and approximately $12\frac{1}{2}$ lbs. of the liquid oxygen explosive per 100 cu. yd. of overburden is what we consider a fair average; however, these figures change continually, depending, of course, upon the varying overburden conditions. There has always been a wide difference of opinions as to how much the overburden shooting actually shatters or chills the coal. Estimates as to the amount of fines produced by this shooting vary as much as 10 percent. Because of the number of variable conditions involved it is practically impossible to draw any definite conclusions as to the amount of minus $1\frac{1}{2}$ -in. coal produced by the overburden shooting. With the dragline type excavator, it is necessary to shoot the overburden harder than for the shovel type machine; yet, we produce coarser coal with the dragline shovel than we do with the dipper type shovel.

We employ two types of excavators—one is the caterpillar dipper type shovel, where the machine travels on the coal, and the other is the dragline, with the machine working on top of the overburden. We have less waste in the pits on account of cleaning the top of the seam, with the dragline operation than with the larger dipper type shovels. In comparing the two types, from actual loading records, over a period of time, we are able to conclude that the percent plus and minus $1\frac{1}{2}$ in. will vary as much as 10 percent.

My opinion about the shooting of the overburden for both types of strippers, is that in each case the coal is chilled to a certain degree, depending upon the location of the drill holes with respect to certain strata areas, because of the fact that in horizontal drilling, only certain formations can be drilled economically. The difference in size will be due to the crunching and grinding of the caterpillar paddles of the dipper type shovels, while with the dragline operation, the machine works on top of the overburden, and thus the heavy weight of the machine has no effect on the coal. This degradation caused by the caterpillar paddles affects realization very deeply on two accounts—first, in our method of cleaning the top of the seam, most of these fines will be pushed off into the spoil bank, and also, the excessive minus 28 mesh produced will be pumped away in our dedusting and washing plants.

In the shooting, in the seam, the coal is generally shot hard enough to loosen it, so that the loading shovel will have easy digging. In shooting



Horizontal drilling of shale overlying the coal



Liquid oxygen is used in blasting overburden

both overburden and coal, very little attention is being paid by either method to improve or better the quality of coal, but simply to make easier stripping and loading, always with increased production in view. I believe, with very close supervision of the shooting of the coal and drilling and shooting of the overburden, not only will the coal be made easier to load, but also, there will be an increase in realization, due to the fact that you will have better control of the various size fractions which are produced.

Shooting coal far ahead of the loader, without any regard for the benefit to be derived by controlled shooting, will benefit neither the ease of loading or, in any manner, the quality of the coal. The top of the seam is bulldozed and kept free from slate and other foreign material, as the overburden is being stripped. Then, when the loading shovel moves in to load the coal, the top of the seam is bulldozed again to clean any foreign material

that may have appeared from rain or wind. Ahead of the loader, men use shovels to remove any small amount of visible impurities that escape the bulldozer.

Keeping water pumped out of the pits during heavy rainfalls, or water that seeps out of the spoil banks, requires a series of centrifugal pumps that are kept set up at all times. Temporary gathering sumps are dug with the loader to keep the pumps running, so that there will be no water at the face. The valleys and ravines above the pit are dammed, so that the water that would otherwise go into the pits, will be caught and controlled for pumping. Sometimes the water behind the dams can be flumed around the pits, so that the excess water does not have to be pumped. The loading of the coal out of pits with water in them is a very undesirable practice, because of the possibility of loading fireclay, and we pride ourselves in loading coal out of

pits that are kept perfectly dry at all times.

In the loading and handling preparation of the coal, much value will be gained by the least number of times that the coal is dropped, conveyed, or handled in any manner. Our coal is friable, breaks into small cubes, and has the very detrimental characteristic of breaking down into small and finer sizes each time it is moved one way or another. The shovel runners load the coal out of the seam with either 3½ or 5 cu. yd. shovels, each runner having been previously instructed to keep the dipper out of the fireclay bottom, and to crowd the spoil bank only in such a manner that he will neither leave any coal in the rib, or load any extraneous material.

By continued and various degrees of experimentation, loading shovels are now designed and operated with such accuracy that very little foreign matter of any kind need be loaded. The percentage loaded is so small, that it is practically impossible to put your mark on any set amount of foreign material that they will load, that is, outside of what actually existed within the seam.

The operator of the dipper type shovel gathers his coal in the dipper as quickly and carefully as possible, and hoists and turns at the same time, in order that the coal will get into the trucks as quickly as possible. The momentum of this mass of coal will naturally cause more or less breakage, providing care is not exercised by the runner when he drops the coal into the 25-ton trucks, so that the least breakage will occur. The truck, after it is loaded, then moves to the transfer hopper, where the coal is dropped out of the bottom of the truck into a small hopper, and this has a tendency to increase coal breakage. Gravity feeds the coal from the hopper onto a long transfer conveyor, where it is discharged over a grizzly above the transfer hopper. The grizzly bars are the source of considerable breakage, especially when the hopper is empty. The coal is then fed out of the transfer hopper, by reciprocating feeders, into the 40-ton electric cars, which deliver the coal to the tipple hopper. As the coal discharges from the cars into the tipple hopper, there will be additional breakage from dropping.

In loading and handling by means of a dragline, the coal is loaded directly into trucks, which move on, dumping into a hopper. The difference in plus or minus 1½ in., from the two types of operations will vary 10 percent. Dipper type shovel pits, with their method, produce 52 percent minus 1½ in., and dragline pits, with their operation, produce 42 percent minus 1½ in.

Concluding the preparation of loading and handling, it must be assumed from these methods that every time

the coal is handled, it must be given careful attention and utmost supervision, in order that degradation will be kept as low as possible at each focal point, so that at no place will the amount of breakage be out of reasonable control. With continued study, and with the thought in mind of handling with least degradation, there can and will be a decided gain in realization, and a real improvement in the preparation, from the standpoint of size.

The coal moves from the 250-ton tipple hopper on a short pan conveyor and discharges onto a 4-ft. elevated

it advisable to discontinue the loading of anything above the top size of 7 in. This 7-in. plus is reduced in two stages, the first with a pick-breaker, and then it is conveyed to a two-roll crusher, which breaks all pieces to a minus 7-in. size. This entire mass is moved to the conveyor that leads to the washer.

The 7 x 2-in. and the crushed 7-in. lump drops into a flight conveyor, all of which constitutes the feed to the washer. We have a 5-cell air pulsated water type washer. Our feed to the washer sometimes is 600 tons per hour. However, the loading and handling



Trucking the coal to the transfer hopper

pan conveyor, which feeds the coal onto reciprocating shaker screens. This brings the coal to the screens in a uniform flow, which allows maximum operating efficiency of the screens over a given period of time.

I think it will be a good plan to follow each size that constitutes our run-of-mine coal, so that an idea can be gained as to the disposition, and how each affects classification, cleaning and blending.

On the upper section of the main shaker, we make three sizes, the 7-in. plus, 7 x 2-in., and 2-in. minus. The 7-in. lump is crushed, the 7 x 2-in. goes to the washer, and the minus 2-in. to the rescreener.

Beginning with the 7-in. plus, we break it down to below 7-in. top size. The reason for this is the fact that lumps of any large size are held in this shape by blades or bands of pyritic sulphur. It is also a natural characteristic of Indiana No. 5 coal to fracture in small cubes. We have made a good many tests on our 7-in. lump, and approximately 80 percent of the increments are banded coal. Therefore, in order to facilitate our cleaning process and not load a product over which we have very little ash control, the management has deemed

conditions, plus the segregation connected with handling, causes a very wide variation in the feed relative to quantity, because of the wide deviation in the plus and minus 1½ in. We figure, average feed to washer is near 500 tons per hour.

The impurities in this coal vary just like the quantity. We have high feed and low impurities and low feed and high impurities, or any combination of these. From the above variables we have found that it is necessary to keep changing the washer settings to keep pace with these very disagreeable feed conditions.

The quality and quantity of feed varies as much as 100 percent. By that I mean the amount of the feed will double itself, and also the number of impurities will more than double themselves, and because of the type of our operation, these wide differences occur in a very short period of time.

With all the devices that are already on the box, we also have what we call a "hydrometer," a device that picks up by weight the variations in both feed and impurities, and this enables the operator to keep a very close check on the inner conditions of the wash-box variations.

We set out originally to wash at 1.55 gravity, which would give us approximately 9 percent ash coal, based upon ash content, from the preliminary studies of our run-of-mine. However, when we marketed the coal, we found that coarse coal, that is, stove and furnace chunks, were not bought on ash content, but on visual inspection. We had less than 8 percent of plus 1.45 gravity pieces, but still our customers refused to accept the coal on account of these banded low gravity pieces. We are now washing our coal at approximately 1.45 gravity, and with only 5 percent of higher gravity pieces and less than .7 of 1 percent of pieces above 1.55 gravity.

In order to do this without serious coal loss, we reduce the middlings or secondary refuse by mixing with the 7-in. lump and crushing them in the same manner and rewashing them. This method automatically builds up a recirculating load in the washer of middlings pieces within the 7 x 2-in. range. When this secondary refuse begins to fill up the washer system, we by-pass the secondary middlings directly to the refuse until the middlings in the bucket elevators begin to carry a small amount of coal, and then the recirculating process is repeated. It may be said that we are now making plans for the reduction of the middlings directly to minus 1½-in.; not only as an economical measure to recover more coal, but to eliminate the recirculating load through the washer system, thus increasing efficiency in every respect. A few figures from a detailed study of our washer performance are as follows:

Feed averages 500 tons per hour. This includes approximately 400 tons of raw 7 x 2-in. from the pits, plus 100 tons per hour of the crushed 7-in. plus and secondary refuse.

Our total refuse from the washery will average 8 percent of the feed. This 8 percent is made up of both primary and secondary refuse. The primary refuse shows 95.5 percent sink at 1.55, and averages from 10 to 25 tons per hour, depending on impurities from pits. The secondary refuse shows 41.1 percent sink at 1.55, and will average 45 tons per hour. The amount of secondary refuse bypassed determines total refuse, and also the percent of coal that will be in total refuse.

After the coal passes through the washer, it moves over dewatering screens to take out the plus 1½-in., then it is conveyed to the lower section of the main screen where it is classified into 7 x 4-in., 4 x 3-in., and 1½ x 3-in., then over degradation screens, and loaded direct into railroad cars via booms, or blended together with a cross-flight conveyor before loading in the railroad cars.

The minus 2-in. from the upper section of main screen falls to a conveyor belt and is brought to the screener building, which contains a reciprocating shaker screen, and six vibrator screens plus 5 steel bins to receive various standard sizes that are produced.

With the reciprocating shaker we only try to screen as low as ¾-in. material, because of the variable weather conditions that govern the surface moisture content of our coal. The two sizes, 1½ x 2 and ¾ x 1½, are taken from the shaker by circular chutes, which drop these sizes into bins with least possible breakage, each bin holding approximately 50 tons. The total of minus ¾-in. is divided equally over four vibrators with 5/16-mesh screens, each having sprays discharging approximately 200 gallons of water per minute to help remove the minus 5/16-in. material. The ¾ by 5/16-in. product recovered drops into bins, and when the bins are empty with the coal falling in this manner, size analysis shows as much as 10 percent degradation below size, because of this 20-ft. fall. However, when coal is in the bin, the amount of breakage is obviously reduced. The minus 5/16 coal falls into a tank which has a conveyor running through it, and as the coal settles, the flights of the conveyor gather it and take the coal up to the 10-mesh vibrator, where the minus 10-mesh coal is removed with water sprays helping the screening. The 5/16-in. x 10-mesh falls directly into one of the bins. The minus 10 is flumed to a 28-mesh vibrator, which removes the minus 28-mesh, and the 10 x 28-mesh goes to the bin, and the 28 minus is pumped away to the refuse.

The bins which contain the sizes down to 5/16-in. bottom size, have degradation screens under them, to take care of all degradation that occurs by handling in and out of the bins. All sizes below 5/16-in. are loaded directly into cars without passing

over degradation screens. Under the bins is a mixing loading conveyor, where all sizes are blended and loaded direct into railroad cars.

We make size analyses on all standard and blended sizes. The size fractions are all plotted on charts. These charts give us a very accurate check on what the salesmen can expect out of our preparation. We have set up certain standards, which we go by, and any deviation from these standards that an assignable cause governs, is taken care of immediately by the operating department, so that coal will be loaded with very little change from standard, both as to ash and size consist.

Three years ago, we installed an ash control system on our ¾ x 10-mesh size. The reason for selecting this size was, because it offered the best opportunity to include a complete survey of our operation day after day, because almost every other size is crushed, blended, or mixed in some manner, and some days not even loaded. From the loading list each day, the number of railroad cars to be loaded regulates the way the sample is taken. Standards set up by the A.S.T.M. in coal sampling are followed 100 percent in obtaining the sample over the entire day. The idea is, that from pre-determined calculations, as long as the sample results fall within certain established limits, the ash is controlled by chance causes, and when the results fall outside these limits there will be an assignable cause or reason. From the curve obtained and records of loading at the mine, we have found that pit conditions govern the ash very noticeably, and this enables the supervising forces in the pits to keep our ash within very accurate limits.

Concluding, with established facts and experiences, careful supervision and standard practices of shooting, loading, handling, cleaning, and classifying, a very uniform product can be produced from open-pit coal mines.



Tipple and coal preparation plant of Enos Coal Mining Co.

Jeffrey

35

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Mitchell Slice Stoping As Practiced At Butte

Some modifications of a mining method which permits rapid extraction and keeps operations ahead of any heavy ground

THE MITCHELL SLICING METHOD is not a new mining method developed at Butte. It is primarily a modification of square setting as developed at the Calumet and Arizona Mine, Bisbee, Ariz. The general plan is to mine by square setting along the sides of a small block of ore; the top of the pillar thus formed is then mined, and the ground or gob above is timbered. Under this protection the remainder of the pillar is sliced downward by underhand stoping. Advantages of the system in general are, a saving in labor, timber, and powder as compared with square set stoping. Special advantages are the rapidity of mining and large tonnage output in a relatively short time.

This method was introduced and has been developed to its present stage at the Leonard Mine of the Anaconda Copper Mining Company. It is probable that the method will show as much progressive improvement in the future as it has in the past and so this article should not be accepted as any more than a paper on the development of the method up to the present time.

In some of the "heavy" veins, and the Minnie Healy in particular, at the Leonard Mine, the management felt that some method which would provide more rapid extraction and keep ahead of the ground "taking weight" would be more efficient than the conventional square set method. The Mitchell slicing method was the one decided on for this purpose and it has been successful in achieving this aim.

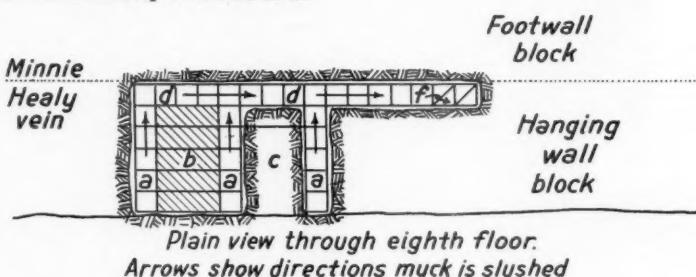
The first application of the method was, in effect, a sub-level Mitchell slice. This was safe procedure because it involved introducing a method new to operators, workmen, and local ground conditions. Intermediate drifts were driven from the eighth and fourth floors of an initial raise along the strike and center line of the block. Intermediate cross-cuts were then driven at right angle to the extrac-

tion drift to the hanging wall and footwall of the vein, and were spaced 16 ft. or three sets apart along the vein. "Slots," which are timbered excavations one set long and as many sets wide as the width of the vein or the width of the block, were raised from the cross-cuts to the level above. Figure 1 illustrates this method. These slots blocked out the core to be sliced. The next step consisted of ex-



By L. F. BISHOP

General Production Foreman
Anaconda Copper Mining Co.



Plain view through eighth floor.
Arrows show directions muck is slushed

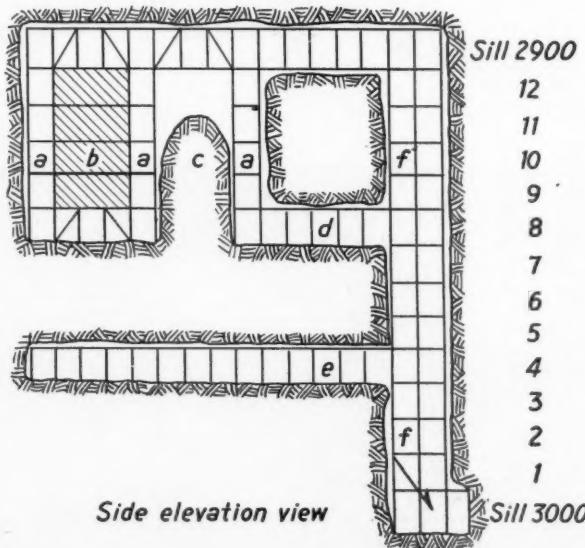


Fig. 1. Mitchell stoping using 4th and 8th floor slots and extraction drifts

- a. Slot from 8th floor to 2900
- b. Core mined and filled
- c. Core being mined
- d. 8th floor extraction drift
- e. 4th floor extraction drift
- f. Down-chute raise

This article contains excerpts and drawings from Engineering Research Department Report on Mitchell Slice Stoping by F. Gibson and N. Vianes which also appeared in the May issue Montana School of Mines *Metallica*.

cavating and timbering over the top of the core with truss sets so as to remove any down weight from the top of the core. When the top was secured the slicing of the core progressed downward. As soon as an opening was made across the core from slot to slot a core girt was placed to hold the timbers of the slots; these core girts, 15 ft. in length and extending across the core from slot to slot, replaced posts and caps that would have been used in a conventional square set block.

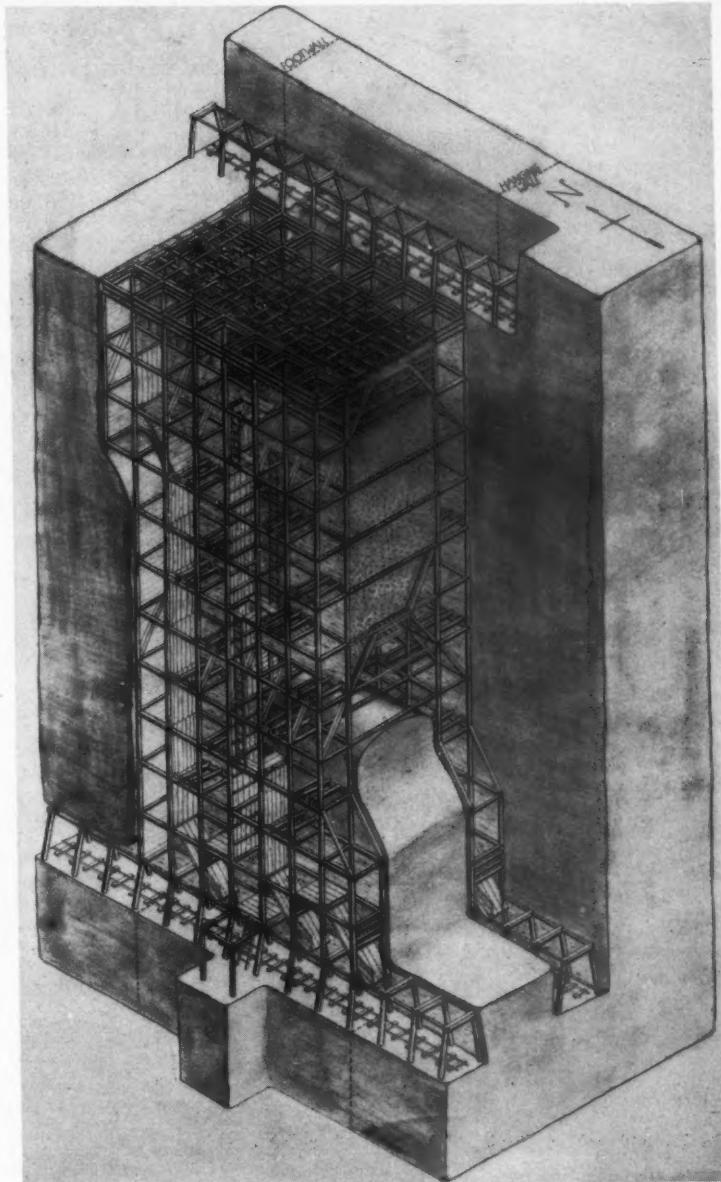
The drilling was done from the slots and the broken rock dropped down the slots, via staggered bulkheads, to the intermediate cross-cuts. This necessitated considerable double scraping—from the cross-cuts to the extraction drift and from the extraction drift at the cross-cuts to the down chutes, although it was reduced as much as possible by allowing the slots to fill with ore and rill to the extraction drift. Also, at each intermediate level the rough bottom of the core had to be cross-slashed.

Seeking to reduce the double scraping work the first improvement was the elimination of the extraction drifts as such by driving down-chute raises to connect with the ends of the intermediate slots and by driving cap-sills out from the down-chute raises beneath the slots to form a funnel under the entire length of the slot. This was intended to eliminate the slushers entirely; however, owing to the short vertical height from the sill below to the bottom of the slot above, the down-chute raise could not be winged steep enough to allow a free flow of rock from the slots above.

The timber in the intermediates required sills under the posts for coming up under this work from below. The best sills for this purpose were slabbed stulls 12 ft. long with square daps cut in the top side to receive the bottom horns of three posts; the sills were placed girtways and spreadered capways, which kept the posts from "kicking in." Rails were placed on the spreaders and served as a good track for scraping or as grizzlies if a raise or slot were holed from below. The joints of the sills were staggered so as to avoid a break in support.

The final change in slot arrangement was to drive the slots from level to level and thus eliminate the intermediate work and down chute raises. This is the present system used on the 3,100 and 3,200 levels and has been highly successful.

A 3152-71S core, which was the first core to be mined from slots driven from level to level, was also mined from level to level before filling. This was considered too much open ground and also required too much filling at one time so the cores that are being mined now are taken down to the sixth floor, filled, and then mined down the remaining five floors.



This photograph is an isometric picture of a Mitchell Slice Stope. The slots have been driven from footwall to hanging wall of the vein and from sill to sills; and core is being mined. The top hanging wall core block has been mined, filled and bulkheaded on the sill; the top footwall core block has been mined and is being filled; the bottom hanging wall core block is being mined; and the bottom footwall core block has yet to be mined. In some places the slots actually extended for one or two sets into the footwall and hanging wall; however, for illustration purposes, they have been shown the same length as the core.

A3190-98 Stope:

This stope, which has now been completely mined and filled, will be used as a model for discussing the present Mitchell mining system on the 3,100 level at the Leonard Mine. In Butte at this time, A3190-98 stope is the latest complete evolution of that system. From footwall to hanging wall, the stope averaged about seven sets (35 to 40 ft.); and from sill to sill,

the vein's dip off set the sills about two sets (5 to 10 ft.). The ground mined was typical Minnie Healy structure—heavy and containing many talc seams, especially in the hanging wall vicinity.

Method Involves Three Primary Operations

A Mitchell stope may be broken down into three primary operations: (1) Driving the slots; (2) mining the

core, and (3) filling the core. This discussion will follow that order in describing the entire procedure.

Type of Timber. The type of timber used is essentially the same as the standard Rocker stope-timber varying only in the size of the framing, but remaining the same from center to center of a timber set to conform with the standard lengths of lagging, chute lining, etc. For added strength the horns on the caps and posts were increased from 4 to 6 in. square, the length of the horn on the cap was increased from 2 to 3 in. and the second frame was increased from 8 to 10 in. This is known as Southwest Framing. This also necessitated changing the girt horns from 4 to 6 in. to 6 by 10 in. On an average the Mitchell timber is a little larger in diameter than the regular Rocker timber.

Slot Breaking and Timbering. Mitchell slots are driven from sill to sill as raises and are started from slot cross-cuts on the sill. The slots are mined one set wide and from hanging wall to footwall of the vein in length. Generally the slot is divided approximately in half and the hanging wall section is driven from sill to sill first. A crew of two men is usually employed in each slot.

These slots were started similar to a regular raise, using stop boards for loading the first and second floor muck into cars. When these floors had been mined, overhead chutes were installed in alternate sets. Generally the slots are driven by blasting a six-post raise round over the manway, timbering, and then breasting or stoping down the remaining length of the slot to the hanging wall of the vein. The manway is carried in the center of the vein so that the dip of the hanging wall will not affect it being driven vertical, and also that it may be used when mining the footwall section of the vein. When the footwall section is mined the ground is blasted down going towards the footwall of the vein from the manway already installed when driving the hanging wall slot.

Figure 2 is a sketch of A3190-98S slot showing the manway, chute arrangement, drill rounds, and grizzlies.

As the core lengths are planned distances, the slots must be parallel and must be driven on survey lines to insure accurate core thickness and alignment of adjacent slot timber. The slot cross-cut timber on the sill is plotted and marked in the mine by the mine engineer. After this is done, the miners, checked by the shift boss, keep the timber above the slot cross-cuts in line by plumbing with a string from the center of the girt to be blocked with the center of the previously blocked and aligned girt below. The girts go cross ways of the slots and the caps are length ways.

The amount of ground blasted on a single floor before timbering is dependent on the ground and the judg-

Sketch of a 3190-98S slot being driven.

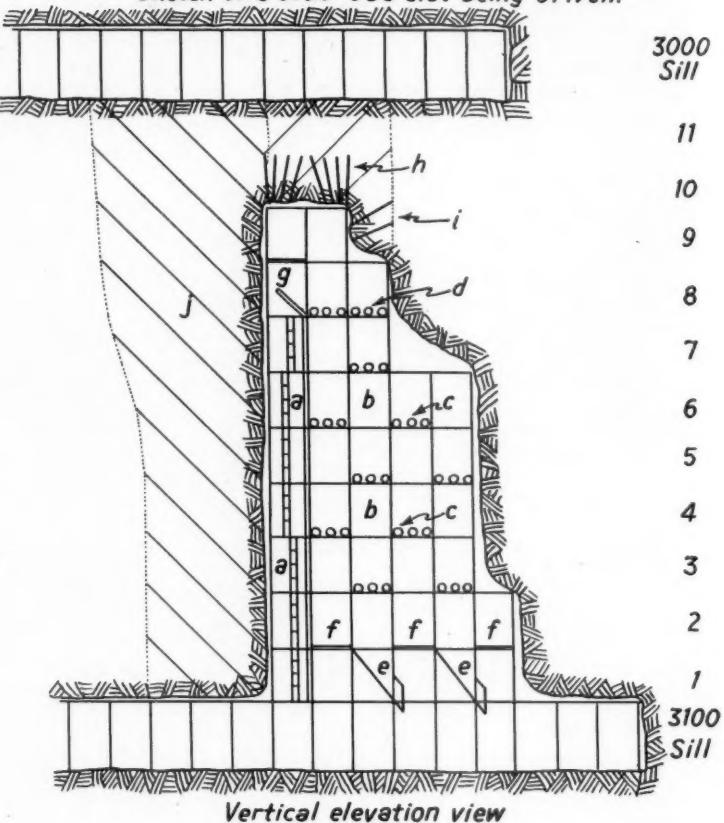


Fig. 2

- a. Manway
- b. Slot
- c. Grizzlies
- d. Blasting floor grizzlies
- e. Over-head chute
- f. Flat bulkheads
- g. Manway slides and bulkhead
- h. Raise round
- i. Breast round
- j. Footwall ore block

ment of the shift boss. The slots are lined with regular 2-in. side lagging placed behind the posts; the manway and remainder of the slot being divided from each other by regular sides of chute lining.

Grizzlies. Grizzlies or breakers are checker-boarded or staggered from floor to floor, as shown in Figure 2, to break the fall of the muck and save the slot timber; thus, the entire slot (except for the manway) serves as a chute.

When the slot idea was first tried out flat floors were used instead of grizzlies to baffle the muck; however, the difficulty of cleaning these floors down when a working place was completed gave way to the idea of using grizzlies instead of floors. The first grizzlies used were squared 6 by 10 in. timbers, but these also were found to be hard to clean down. At present round grizzlies are used, the thought being that by knocking out the blocking the grizzlies may be rolled over easily and thus cleaned down.

As stated, the grizzlies are staggered throughout the slots; however,

on the blasting floor a complete floor of grizzlies is carried as shown in Figure 2. When a new floor is started every other set of grizzlies on the blasting floor is raised to the floor above, which is now the new blasting floor, thus creating the staggered effect of the grizzlies in the slot.

Chutes. Overhead chutes were adopted in these slots as they do not need side-sets for installation.

Timbering and Mining a Mitchell Core

Type of Timber The timber used in the cores are called "core girts" as they have the same frame as a regular girt and are aligned in the same direction in the core as the girts are in the slots. Timbers have been used with a standard cap frame which were called "core caps," but these were discontinued because of the difficulties of getting them into the tenons, and in order to timber the slot caps from footwall to hanging wall of the vein.

The core girts are framed on one end only on the surface and the min-

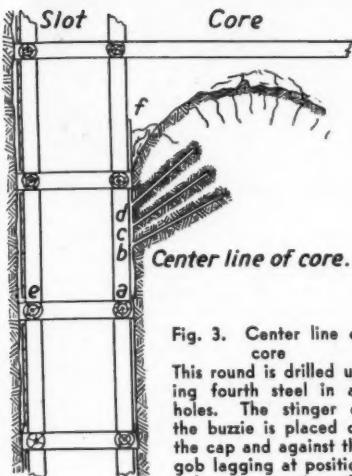


Fig. 3. Center line of core.

This round is drilled using fourth steel in all holes. The stinger of the buzzie is placed on the cap and against the gob lagging at position (e). For getting the correct vertical placement of holes distance (a-b) equals 3 ft., distance (a-c) equals 4 ft., and distance (a-d) equals 5 ft. Gob lagging not removed as shown at (f) is very apt to break the posts it is against when the round is blasted.

ers frame the other end; this allows for any discrepancy in the distance between the two slots.

Some sub-level stopes tried a 10-ft. core girt. Allowing for overbreak in the slot, this cut the actual thickness of the core to about 7 or 8 ft. in width. This was found to be insufficient base cross section to support the core sufficiently so the present slots are driven to be connected by approximately 15-ft. core girts. For a given amount of ground this also cuts the slot costs.

Core Breaking. Three men are usually employed in mining the cores. Mining starts on the top floor of a core and progresses down the core to the sill below. The ground is broken by drilling upward slanting holes with self-rotating stoppers from each slot toward the center of the core. Several experiments in drilling were conducted to find the best drift round for breaking the cores. Figure 3 shows the type of round most successful.

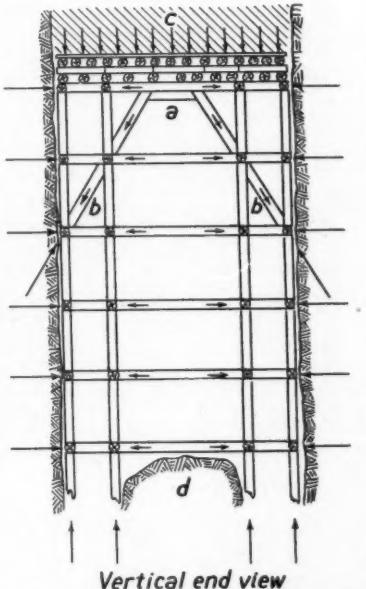
The holes should all be fourth steel. On various occasions, because of lack of time or poor judgment on the part of the miners, a fourth steel round would be drilled from one slot and a third steel round from the other slot. If the ground was favorable the round might break; however, sooner or later a high ridge of solid ground would be left in the center of the core or the side. The third steel round might only blow out and make a hole very similar to a drift round in the side of the core. This resulted in extra cleaning down and plugging with considerable time loss.

The first set of ground to be broken on a new floor usually took nine fourth steel holes from each slot, which would make room for two core

girts. The remaining blasts usually took four to six holes from each slot per core girt. The muck from a blast rills off of the core into the slot; six to 10 sticks of powder were used per hole. The powder used was Du Pont No. 2 gelex, 45 percent strength, 6 by 1 and $\frac{1}{8}$ -in. sticks. By timing and blasting the holes in horizontal rows instead of vertical rows the bottom horizontal row of holes had much the same effect as lifters in a drift round and tended to kick a large portion of the muck off of the top of the core. Sufficient chute room is of course necessary for this to work effectively.

As mining approaches the sill at the bottom of the core, the chute room gets correspondingly less; therefore, quick disposal of the muck in the chutes by the motor crews is necessary to prevent the stope from being muck bound.

On the bottom floor, first floor of the core, a drifter and finn board are used to drill the lifters instead of using a stoper.



Vertical end view
Arrows show direction of stresses.

Fig. 4
a. Truss set c. Gob from sill above
b. Angle brace d. Core being mined

Closely connected with drilling is the dead work required to get a machine set up for each new floor. The side lagging must be chopped from the sets to be drilled, the sides of chute between the manways and slots must be removed, the slices covering the manways must be lowered, and the slots and grizzlies must be cleaned down.

At this time, mention of the cleat lagging used in part of the slots is appropriate. The lagging was cleated between the posts to the slots similar

to the way shaft lining is cleated to the centers in a shaft. This idea was tried with the thought of decreasing time spent removing side lagging from the slots in order to drill the core; however, it was unsuccessful as ground squeeze or muck passing down the slots knocked most of this cleat lagging off.

Core Timbering. After the slots are driven and the sill above the core has been caught up by the core girts and truss sets, the remaining core girts have only direct and squeeze pressure transmitted to them. Because of this, relatively slim or small diameter timber may be used for a long span. The girts are approximately 15 ft. long. Figure 4 is a simplified sketch of the timber stresses in a Mitchell core. Gob weight above the core is transmitted to the ground by truss sets in the core and by angle braces in the slots. Square 12 by 12 in. girts are used in the core wherever a truss set is to be installed as this insures a better fitting truss set. All other girts are round timber slabbed on one side for safety purposes.

The girts, as they come down from the surface, are framed on one end only. The miners measure the length of the girt to be timbered, frame it on the sill above, and lower into place in the stope. To get the girt into the tenons a post on one of the slots must be chopped back; when the girt is in place, a scab is nailed onto that post to keep the girt from jumping out with the next blast.

To prevent the girts from breaking with the blast, temporary posts are stood in the centers of the bottom girts to the centers of the girts above; spreaders are also placed horizontally between the girts. The slot posts on the floor above the drill setup are braced girt ways in the middle of the posts. All of these braces are for the purpose of saving the timber from the blast and not for holding ground weight. When a new floor is started these braces are removed and used on the next floor as much as is feasible.

The footwall and hanging wall of the core are safety gobbed using old guides or sheeting poles vertically placed behind the girts next in the ground; regular gob lagging are then placed horizontally behind these guides and blocked against the ground.

Mucking. Theoretically these stopes were designed to eliminate mucking but studies showed that not enough muck from the blast ran off of the core by gravity to make room for the next core girt and that the pile had to be trenched to some extent by the miners. Other mucking work consisted by cleaning down the slots and freeing the grizzlies.

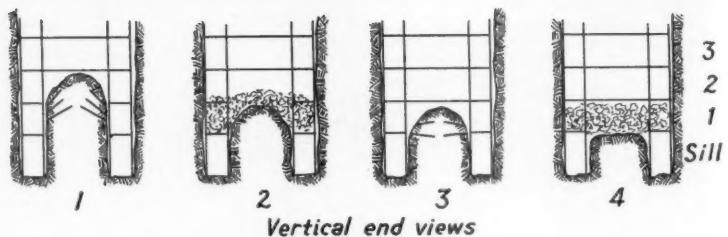
The ground on the first floor is blasted by drifter holes. Both the first and second floor muck are loaded through stopboards into cars on the sill. A slusher is installed for slush-

ing the rock out of the core and for cleaning down the rough bottom of the core to make room for the last floor of core girts. See Figure 5.

If development of the Michell slots on the level below that from which the core is being mined can be completed before the bottom core block is mined, the slusher and stopboard muck could be eliminated. The last two floors of the core, instead of being loaded through stopboards into cars on the sill, would merely be dropped into the slots from the level below and the ore pulled from the chutes on that level. This would also eliminate considerable bulkheading. At present the sill plug left at the bottom of the core is to be mined from the next level below and will entail some bulkheading when it is removed unless it can be filled at the same time the upper part of a lower core is being filled. The slots from the 3200 level were planned to come up directly under those of the 3100 level; however, this causes undue movement and weight on the sill cross-cuts, so the slots on the 3300 level have been staggered to come up under the cores instead of the slots. This will allow the slot cross-cuts to rest on the solid core, and thus reduce sill movement and repair. The cores will be mined in a retreating system, abandoning the slot cross-cuts as the cores are mined from under them.

Filling is Generally Confined to Two Types

Timbering and gobbing preparatory to filling will be discussed under this heading. As previously stated, the cores are divided into four blocks; the top hanging wall, top footwall, bottom hanging wall, and bottom footwall, and are mined and filled in that order.



Vertical end views

Fig. 5

Steps 1 and 4 show the last two floors (first and second floor) of a Mitchell core to be mined. Step 1 shows the chutes removed from the slots for drilling purposes, the stop boards installed over the sill cross cuts, and the buzzie round for breaking the second floor rock. Step 2 is after the blast; this muck is loaded into cars on the sill through stop boards. Step 3 shows the second floor muck cleaned down, the second floor core girts timbered, and the drifter round for breaking the first floor rock. Step 4 shows the broken rock from the first floor. A slusher will be installed for cleaning this muck out of the core and into cars on the sill in order that the first floor core girts may be timbered. This is also stop board muck

Mitchell-core fills may be divided into two types, the top and the bottom fills. The discussion will not include

filling the slots as they were not filled in A3190-98 stope; however, if the slots are not to be used for mining



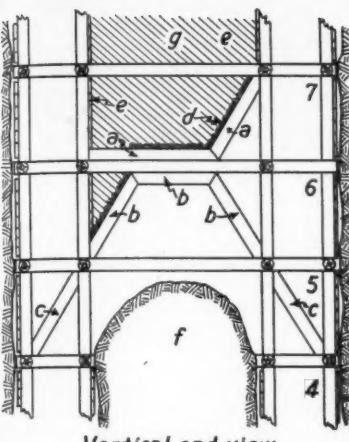
Truss sets support the weight of the fill from a 3000 stope above



Gobbing inside of core to separate it from the slot prior to filling

another core, they are also filled at the time the bottom or lower core block is filled. This would eliminate gobbing the lower half of the cores.

Top Fills. The core is mined down six floors, the walls being safety gobbed as mining progresses, before filling. The fifth and sixth floor core girts are squared 12 by 12 in. timbers to insure a proper fitting truss set on the sixth floor. Doubling-up caps and angle braces are placed on the seventh floor in the core, truss sets on the sixth floor in the core, and angle braces on the fifth floor in the slots. Refer to Figure 6. The angle braces on the seventh floor in the core, the middle section of the doubling-up caps, and the leg of the truss sets parallel to the seventh floor angle braces are all sheeted with old guides or sheeting poles and then matted with scrap. This forms an inclined fill so the bottom fill will run under the top fill at a natural angle of repose. This saves



Vertical end view

Fig. 6

- a. Doubling-up cap and angle brace
- b. Truss set
- c. Slot angle braces
- d. Sheeting
- e. Gob lagging
- f. Bottom core

slushing waste or bulkheading a void that would otherwise occur between the two fills.

The girts next to the footwall block are gobbed on the inside, using old guides or sheeting poles nailed vertically to the core girts and lagging nailed horizontally onto these. The core and slots must be separated by gobbing inside the core—these slots are to be kept open. A waste dump must be installed at the top of the slot, a slide built across the slot, and a waste chute installed in the core. The waste chute in the core is a skeleton affair to keep any big boulders from bouncing out into the stope and possibly breaking a core girt.

As the core is filled the waste chute is removed from the bottom up. The core girt, not including girts between which truss sets are installed or girts along either wall, are cut nearly through as the waste fills up to them. This allows the weight of the fill to break the girts, and thus for the weight of the fill to be transmitted to the truss sets and subsequently to the ground. See sketch of timber stresses in a Mitchell stope, Figure 4.

When the top core is filled as far as possible by gravity flow of the waste, a slusher must be installed to scrape the fill to the far side of the core from the waste dump. As much waste as possible is scraped into the core at the top and then the remaining space is bulkheaded with bricking and old bulkhead material gathered by cleanup. Studies are being made to eliminate the bulkheading by filling.

The girts on the sixth floor should be at least 2 ft. above the ground. The weight of the fill in the core will cause the slot timber to settle from 1 to 3 ft.; thus, if the sixth floor girts

are touching solid ground, they will break in a very short time. This necessitates changing or doubling up the sixth floor girts when the bottom block is mined.

Bottom Fills. After the top core block has been mined and filled the bottom core block is mined and filled. Essentially the filling is the same as for the top block; the important difference is the elimination of the doubling-up cap and angle brace in the core, the elimination of the slot angle braces, and the inversion of the truss sets in the core. The truss sets inverted thus throw the weight of the fill onto the sill plug. This plug will be mined from the level below.

Another important feature is the slanting sheeting of the top fill. The waste run into the bottom section will fill up tight under this slanting floor on a natural line of repose.

In addition to the slides, waste chute in the core, etc., for a top fill a chute must be constructed in the top half of the slot for the waste to pass down to the top of the core being filled. The slide across the slot is also lowered down to this point.

The weight of the gob causes the slot timber next to the core to be

pulled down from 1 to 3 ft. This causes some movement on the sill and consequently some repair work must be done if the sill is to be kept open.

When one side of the slot is pulled down the slot timber is pulled out of line. This requires bracing and spreading.

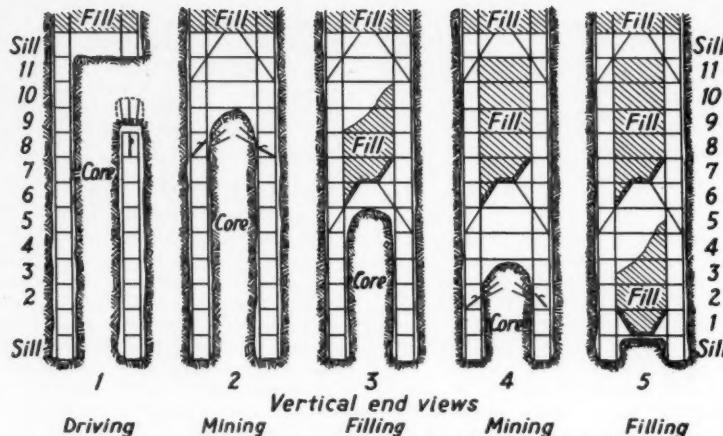
Operating Cycles Assure Continuous Flow of Ore

The sequence of operations in mining the slots and cores in these stopes was a cycle adopted to insure a continuous flow of ore. By keeping one of the operations breaking at all times this was assured. The average time required for taking up slots is about eight weeks and the average time for slicing out the core, top and bottom, is about six weeks; hence, four pairs of slot operations will approximately keep in cycle with three core operations. The operations in the various places would, of course, be staggered with the operations in the other places.

Application. The main limiting factor governing the adaptability of the Mitchell slice stope is to mine ground of large horizontal section where the lateral pressures are not great over the period of time between



Inclined sheeting placed behind trusses on one leg of the sixth floor truss set. Engineer checking the filling coming into lower core under inclined sheeting of previously mined and filled upper core



Five phases in the mining of a Mitchell stope

the start of the mining cycle and the completion of the fill cycle.

The flexibility of the system is shown in the variations to which it lends itself at the Leonard Mine in the Minnie Healy, North Bennett, and Bennett veins. This system is used on the 2300, 2800, 2900 and 3000 levels to mine pillar blocks, block remnants left from previous stoping operations and new ore blocks. On the 3100 and 3200 levels to date, its application has been limited to mining virgin ground in the Minnie Healy vein only;

however, Mitchell slicing will be applied on these levels to any other ground that is adaptable.

The Mitchell slice with slots from level to level is applicable to mining new blocks of ground which are too heavy for square setting successfully, but it will not replace the sub-level method of working from intermediates in ground that is loose and badly broken up or for recovering remnants of ore blocks and pillar blocks. Where it would be necessary to work under loose ground when driving the slots, the practice has been to boom down the slot timber from the top and thus avoid working under open ground at any time. This variation of the system is more costly than the method described, but its use replaces regular square set boom-timbering methods which are more expensive and less productive than the Mitchell slice operating from the intermediates sill.

This comprises the development of the Mitchell slicing method at Butte up to the present. As now in use it is only applied to wide steep dipping veins. It is probable that future work will prove its application, or some modification of it, to some of the flatter dipping veins of the Butte district.



Posts of slots show dapping to permit installation of core girts



Timbermen setting a post in an area above the core



Coal Division Reports

Color Coding of Distribution Power Cables For Polarity Identification

A Subcommittee Report to the Power Committee

INTENSIFICATION of mechanized mining is creating new hazards underground in the handling and connecting of portable distribution power cables. For many years manufacturers have been supplying multi-conductor cables, each conductor of which carries a standard color identification. The color marking, which characterizes each conductor, was originally added to simplify the identification of the conductors being used in individual installations.

With the rapid growth of mechanized mining in recent years and the installation of conveyor systems at the face, it has become essential from the standpoint of safe practices that the identifying colors of multi-conductor cables be used in such a way as to also identify d-c polarity or a-c phases.

The safety frame grounding of all electrical apparatus at the face has become more necessary if operators of equipment are to be properly protected. At face locations which are naturally damp or wet, and where sprinklers are employed to allay dust in mining or loading, shock and electrocution hazards have multiplied. However, where the apparatus frame is safely grounded, an additional conductor must be provided for this purpose.

The existing practice of using the color marking of each conductor as an aid in making the proper connections for a particular application generally creates confusion which greatly increases the electrical hazards. This is because no definite standards are followed to identify the polarity. The red colored conductor may be termed positive in one case and negative in the next. Some companies, recognizing the need for polarity identification standards, have already adopted codes of their own while others are awaiting announcement of standards by one or more of the national standards or-

This report has been tentatively approved by the Power Committee as a recommendation for standardized color markings of wire terminals used in machines and equipment underground. The present lack of uniformity in this respect constitutes a serious accident hazard which should be eliminated, and it is the thought of the committee to submit this code to the American Standards Association for adoption as a Recommended Standard. Contacts with various manufacturers and organizations have already indicated approval of this project but further comment from the mining industry is invited. Please address your communication to American Mining Congress, Committee on Underground Power, 309 Munsey Building, Washington 4, D. C.

ganizations, before changing from present practices, now known to be inadequate.

Accidents due to a lack of color coding have become more frequent. Recently a man was electrocuted through the improper splicing of drill leads. The drill frame was charged inadvertently and when he touched the properly grounded frame of a mining machine nearby with the drill in his hands, he was killed. In a common face set-up involving a drill, mining machine and face conveyor, careless transposition or exchange of the positive and safety frame ground conductors immediately charges all equipment and creates highly dangerous conditions.

A subcommittee of the power committee was appointed to contact the cable manufacturers and the leading standards organizations to determine what might be developed for polarity color coding standards, which would not conflict with any already recognized in other industry or elsewhere. A thorough search revealed there was nothing in the records at cross purposes with what the committee was trying to establish.

One of the principal difficulties lying in the way of the adoption of a polarity color code was that the colors

of black, white and red had been selected years ago by the cable manufacturers as the colors for three-conductor cable. Obviously, if green was to be selected as the safety ground color for both d-c and a-c applications, then it would be desirable to have green for the third color instead of red. The Insulated Power Cable Engineers Association, which includes the leading cable manufacturers, promptly arose to the occasion and revised their standards by interchanging the red and green color markings for three- and four-conductor cable. The next printing of the Insulated Power Cable Engineers Association booklet covering specifications for insulated cables will show the new color standards. These will most likely have prompt National Electrical Manufacturers Association (NEMA), endorsement.

At a meeting in Beckley, W. Va., on June 5, 1943, the power committee of the American Mining Congress approved color standards which are submitted with this report. It was recommended by the committee that this report be presented to the coal industry by publication in MINING CONGRESS JOURNAL. Comments are invited and will be passed on to the power committee and discussed at the Pittsburgh meeting in December, when

final action is expected to be taken. These standards are compatible with any that have been adopted by the following organizations and which have to do with color coding polarity references:

National Electrical Manufacturers Association, commonly called NEMA.

Insulated Power Cable Engineers Association, comprising the principal cable manufacturers.

U. S. Bureau of Mines.

National Bureau of Standards.

National Board of Fire Underwriters, who publish the National Electrical Code.

Several of these associations have already indicated a definite interest in the work of the American Mining Congress power subcommittee and will no doubt adopt standards of their own in conformity with those temporarily approved and presented here. The project has been limited to external machine wiring and portable multi-conductor distribution cables, but may be extended further as the need becomes more urgent.

The Standards

1. Multiple conductor power cables for d-c distribution service.

Black—positive.

White—negative.

Green—Safety ground.

The negative conductor shall always be considered the grounded conductor.

2. Multiple conductor power cables for single phase low voltage a-c distribution service.

Black—phase wire.

White—neutral.

Red—phase wire.

Green—safety ground.

3. Multiple conductor power cables for three phase low voltage a-c distribution service.

Black—phase wire.

White—phase wire.

Red—phase wire.

Green—safety ground.

If one cable is grounded in the system the white cable is to be selected.

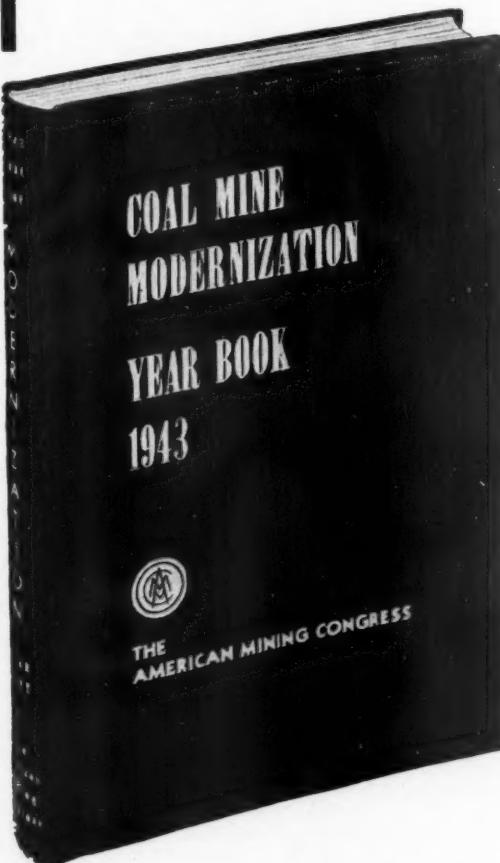
4. Where single conductor cables are used in either d-c or a-c service, the approved color schemes shall be followed by painting or otherwise color marking the cable ends. In such cases, the cable terminals should be made non-interchangeable mechanically if possible.

Approved June, 1943.

Polarity Color Code Subcommittee,
D. J. BAKER, Subcommittee Chairman.
P. M. BARLOW,
M. K. CLAY,
A. L. JOHNSTON,
R. G. JONES,
G. E. ROLSTON,
J. H. SANFORD,
R. G. TURNEY,
C. C. BALLARD, Committee Chairman.

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WASHINGTON 4, D. C.



Wheels of Government

As Viewed by A. W. Dickinson of the American Mining Congress

THE much-needed Congressional recess which began July 8 will terminate September 14 when the Senate and House reconvene to battle with the many national and international problems that members have been discussing with their home constituencies in the brief weeks of legislative pause. By and large it is known that the returning Senators and Representatives are impressed, first, with the charge that the war must be won as quickly as possible; second, with the imperative need for economy in Government and sanity in taxation procedure in order that productive enterprise may carry on in the post-war period; and third, that our future international relations shall be such that the United States of tomorrow may carry on with a high standard of living for its people and with the fullest preservation of our form of Government which has always guaranteed to the individual a reward commensurate to the effort which he is willing and able to put forth.

During the recess Congressional committees have conducted hearings and investigations with reference to the development of our natural resources, and to the protection of the courageous and energetic men who engage in their production. Other Congressional committees and individuals have devoted time to travel and study on the active and potential war fronts in foreign lands and will return prepared to counsel their fellow legislators on the many measures which will bear upon the wars and the post-war international policy.

Tax Simplification

A note of conservatism is found in the recent utterances of Finance Committee Chairman George and Ways and Means Committee Chairman Doughton. The latter has registered his disapproval of tax increases that would "shatter industry" and the former is known to believe that the

Washington Highlights

CONGRESS: Has profitable summer.

TAX SIMPLIFICATION: Seriously sought.

REVENUE BILL: Hope to complete by Xmas.

U. S. STABILIZATION PROPOSAL: Based on gold.

SOLDIER-MINERS: Gradually arriving at copper, zinc, molybdenum mines.

DRAFT: Fathers have until October 1 to choose.

NATIONAL SERVICE ACT: Will it be necessary?

EXIT GUFFEY ACT: OPA takes over coal pricing.

WAR LABOR BOARD: Has new sanction power against unions and employers.

PORTAL-TO-PORTAL: WLB Chairman Davis says "No."

8-HOUR DAY: Many problems involved in coal mining industry.

687 COAL MINES: Returned to operators.

expected tax bill this fall will not yield more than \$5 or \$6 billion additional revenue. Senator George believes that upping the corporation rate from 40 to 50 percent in combination with the 90 percent excess profits tax would reach "the upper limit of what taxes can be imposed without destroying business." This move, he predicted, would bring in \$1½ billion, with increased excise taxes producing another \$1½ billion and additional taxes on individuals producing perhaps \$3 billion more.

Early in August Colin F. Stam, advisor to the taxing committee, requested the American Mining Congress to cooperate in submitting sug-

gestions for simplification of the Internal Revenue laws as advocated by Senator George. The Senator stressed that not only is it necessary to simplify the statutes but that if a statute is supplemented by complicated regulations or technical interpretations, little is accomplished by a simple law. He stated further:

"I believe that the first step toward simplification which should be undertaken by the committee is to make the income tax law more simple and understandable. While it may not be possible to make the law simple in its application to some of the highly complicated problems of modern business, I believe that a great deal can be accomplished towards making the law more understandable, especially for the great mass of taxpayers whose tax problems are relatively simple.

"I believe that emphasis should first be directed toward the income tax rather than the excess-profits tax, as I hope the excess-profits tax can be repealed immediately after the termination of the war, in order to encourage new ventures and stimulate private enterprise.

"It is my opinion that it will not be possible to accomplish any substantial simplification of the income tax laws during 1943, but that something can be accomplished in that direction in 1944."

It is the hope of Senator George that the tax bill can be completed by Christmas and that early 1944 will witness the beginning of work on a tax simplification bill which would eliminate the necessity of annual tax returns by some 25 to 30 million persons, through collections at the source under an arbitrary rule but with each taxpayer still having the option of filing an annual return. He also indicated that corporate, estate and gift taxes present an opportunity for simplification which has been neglected for many years.

On August 27 the Treasury announced that it had recommended

legislation extending the time for application by corporations for relief in connection with the excess-profits tax under Section 722 of the Internal Revenue Code. This would permit corporations to make application under Section 722 at any time within the period allowed for claims for refund. This period is generally three years after the tax return is due. Letters carrying this recommendation have been transmitted to the chairmen of the Finance and Ways and Means Committees and, though it is doubted that legislative action can be taken by September 16 (the date by which applications under the relief section must be filed under present law), it is stated that the change would be made retroactive to 1942 and prior years to which Section 722 is applicable.

International Stabilization Fund

The Treasury has brought out a new draft of its counter proposal to that of the British for an International Stabilization Fund to be used in stabilizing currencies in the post-war world.

The new proposal stresses the importance of gold as the basis and thus counters the British plan which endeavors to put gold in the background. Stabilization of exchange rates would be accomplished through the use of a total amount of about \$5 billion, of which the United States would furnish \$2 billion, and our Government would be enabled to exercise veto powers on changes in the gold value of the "unitas." The gold value of the unitas could be altered only by an 85 percent vote with the United States carrying approximately 20 percent of the total voting power.

It is planned that conferences will be held with the representatives of about 32 countries concerned but Secretary Morgenthau has stated that there will be no formal conferences until he has held further consultation with the Congressional committees interested in this subject.

Army Releases Men to Mines

In the first week following August 11, over 600 former or potential metal miners were released from active military duty by the War Department in an effort to relieve the serious manpower shortage in copper, zinc and molybdenum mines. Authorization has been given for the release of 4,500 of these soldier-miners on a voluntary basis, and it is stated that the only men considered are those with previous mining experience or those possessing necessary physical qualifications.

Men thus released become members of the Enlisted Reserve Corps so long as they continue in non-ferrous mining employment or until they are recalled to duty by the Army. In the procedure followed, the soldiers indi-

cating an interest in obtaining releases are referred by the Army camp commander to the United States Employment Service interviewer stationed at their camp. If, in the opinion of the interviewer, the applicant is qualified for employment in the mines, the commanding officer of the camp is notified and the man sent to Fort Douglas, Utah, where he is referred to an appropriate employer's hiring representative. Travel from Fort Douglas to the place of employment is provided by the employer. After the worker is actually on the job and has found housing, the Government will provide transportation for his dependents and household effects.

Manpower Program

The War Manpower Commission on August 14 announced its latest step in "non-compulsory" action to stimulate production of essential war materials simultaneously with the effort

Straight From the Shoulder

The following is a telegram sent to the Navy Department Price Adjustment Board, New York, from the Advisory Board, Lincoln Electric Co., on September 6, asking for facts on renegotiation:

"We, the members of the Advisory Board of the Lincoln Electric Company, representing 1,400 employees, have been advised today for the first time that your board is renegotiating the Lincoln Electric Company for 1942. Since many of the workers are stockholders and all share in the profits, this matter is of vital importance to all of us. Hence, we want your answer to the following questions:

"1. We are producing at more than four times the rate per man-hour of any of our competitors, as you know from your investigation. How much must we reduce this efficiency and raise costs to keep from being penalized in renegotiation? Please be specific. Should it be reduced one-quarter, one-half, three-quarters or more?

"2. Have you squared your policy with WPB and the Treasury? WPB asks for more efficiency. The Treasury asks for more taxes. The penalty you set up will tremendously reduce both.

"3. This penalty for efficiency was not made public in the renegotiation law as passed by Congress. Why? No such penalty for efficiency is apparent in our reading of the law.

"We are requesting our chairman, Mr. Lincoln, to follow the matter so that this penalty on efficiency may be stopped."

"ADVISORY BOARD, THE LINCOLN ELECTRIC COMPANY.

"By J. F. LINCOLN,
"Chairman."

to increase the number of men available to the armed services. A list of 149 "super-critical" occupations has been published by WMC as a basis for deferment from military service. Drafting of fathers is authorized to begin October 1, and pressure is brought on these men, together with other workers possessing essential skills, to enter war industry or supporting civilian activities by October 1 or lose further claim to occupational deferment.

Thirty-nine key occupations of the mining and smelting industry are included in the list which supplements the present Activity and Occupational Bulletins of the Selective Service System. In determining "replace ability" local boards are under instruction to give preferred attention to occupational deferment, considering carefully the effect of taking a man from work necessary to the war effort.

Unnecessary migration of labor is discouraged by the provision that certain workers may be hired only on referral by the U. S. Employment Service. Such persons include (1) those to be hired for work in one of the critical occupations or those whose last employment was in a critical occupation; (2) those who have not lived or worked in the locality of new employment through the preceding 30 days; and (3) those leaving agricultural work for non-agricultural work.

The salient features of the entire WMC program are (1) the list of super-critical occupations; (2) the revision of the non-deferrable list; (3) the new occupational classification policy for local draft boards; and (4) the new standards governing transfer of workers from job to job.

It is entirely possible that the War Manpower Commission action indicated above is a last step to be carried out before Government officials charged with the successful prosecution of the war turn to legislation providing for a National War Service Act. It will be remembered that the Austin-Wadsworth bill is still before the Military Affairs Committees of both the Senate and House and that it was the subject of extended hearings in the past session of Congress. The American people may not wish this type of legislation but there is no question that it is definitely in the minds of many officials of the Government.

Exit Guffey Act

Midnight August 23 marked the expiration of the Bituminous Coal Act of 1937. Thus ended a cycle which began with the enactment of the first Guffey Act in 1935, preceded by efforts at coal industry control legislation in the Davis bill and the Hayden-Lewis bill.

The archives of the Bituminous Coal Division have been transferred

(Continued on page 64)

Make your idle equipment available to other mines...



Information supplied by an Industrial publication

The shortage of operating equipment has been felt by the mines as by other industries. Operators placing orders for equipment with manufacturers may be promised a six months delivery on an urgently needed item. Even though mines usually buy only new equipment, they should realize that good reconditioned equipment may be obtained from other mines which do not need it so urgently, either by exchange or outright purchase.

Hudson Coal Company recently advertised to metal mines "If you are having difficulty obtaining

standard replacement parts, we may be able to help you" listing equipment to help the other mine out of difficulty.

Dorr Co. conducts "an inventory of used but still serviceable Dorr equipment, now available for resale, for the benefit of clients whom we are unable to supply in the normal way". From this record they put Jim Jones in touch with Bill Smith and then step out of the picture. Much badly needed equipment is thus being made available to operators who would otherwise be unable to get it.

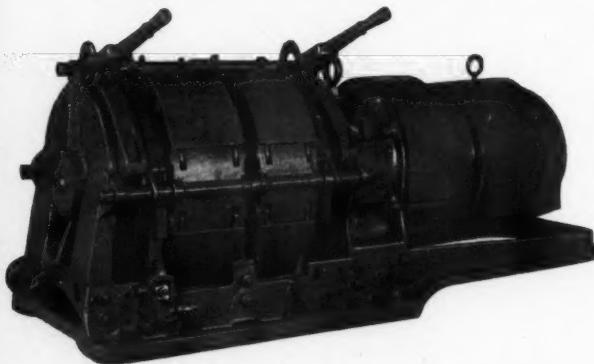
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.



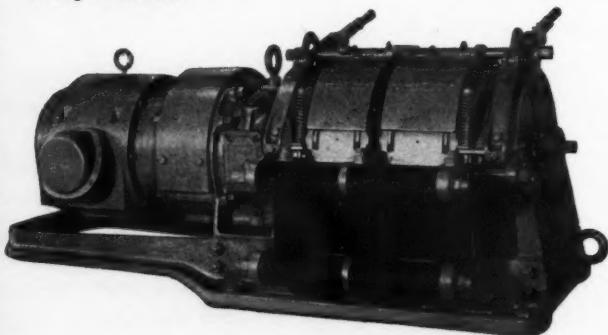
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★ Operating Side of the HYDRA-HAUL. The mechanism is completely sealed to retain lubricant and prevent the entrance of dirt. Foot brake is shown, but hand brake is furnished if desired. Roller bearings are provided throughout, Timken bearings being used when adjustment of end play may be needed. Such adjustment can be made without difficulty from the out-board end. Four points of lubrication are provided for the hoist mechanism proper, shrouded Zerk fittings being furnished.



★ Cable Side of the HYDRA-HAUL. Note the one-piece frame, extended under the motor for better protection of the latter when transporting the hoist. Drum chambers are provided with swinging covers to allow easy access. The hoist structure is fastened together by three through bolts of alloy steel, secured with special locking cap nuts.

TODAY, with machinery and equipment of every kind becoming more and more difficult to obtain—including electric motors and haulage cable for your scraper work, the introduction of the HYDRA-HAUL, with Fluid Drive and Anti-backlash mechanism, is important news. After nearly three years of experimental and development work, much of it in actual service under ground, HYDRA-HAUL is in production.

Of first importance in the HYDRA-HAUL design is the Fluid Drive, through which the motor is protected from burn-outs due to stalling. The hoist mechanism itself is also protected from strains and shocks by the cushioning effect of the fluid coupling. When the HYDRA-HAUL is stalled from overloading, the motor continues to rotate safely, at 90% of normal speed, while transmitting maximum cable pull. The cable is also protected from shock loads of positive stalling, such as would be induced when the motor is mechanically connected to the hoist proper. The Automatic Anti-backlash control prevents snarling and piling-up of the cable coils on the drums, an important means of prolonging cable life.

HYDRA-HAUL is an important development to every property employing scraper haulage methods. Write today for specifications and prices.

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PERSONALS...

D. C. Kennedy, executive secretary of the Kanawha Coal Operators Association has been granted a furlough by that institution to permit him to serve on the Coal Mines Administration Board appointed by Secretary Ickes to effectuate the maximum production of coal. Harry G. Kennedy, labor commissioner for the association, was advanced to acting executive secretary, but will continue to handle the commissioner's duties in conjunction with his secretarial work.

Charles Park, geologist with the U. S. Geological Survey, who has been in charge of geological mapping at Iron River, Mich., has been called to Washington State to undertake some special work.

Lloyd M. Scofield has resigned from the geological staff of the Calumet and Hecla Consolidated Copper Co., to accept a position in the Duluth office of the Pickands Mather and Co. Before going with the Calumet and Hecla Company, Mr. Scofield was in the engineering department of the Pickands Mather and Co. at Ironwood, Mich.

William M. Lacey, formerly project manager of the McAlester Fuel Company, is now superintendent of Salmon & Cowin Inc., Birmingham, Ala.

Fred L. Zollinger has been appointed superintendent of Loree Colliery, which has been in operation during the last year. He was formerly superintendent of the Marvine Colliery, the position which is now being filled by **A. J. Weigand**.

T. H. Wickenden has been appointed manager of the development and research division of International Nickel Co. and **H. J. French** as assistant manager, according to a recent announcement by Robert C. Stanley, president of the company. Mr. Wickenden, who has been assistant manager of the division since 1931, succeeds the late Albion James Wadhams.

John A. Bowsher, mining engineer for the U. S. Bureau of Mines, has been assigned to the Missouri area of the Tri-State zinc-lead mining field, with headquarters in Joplin.

Walter Mathesius, vice president in charge of operations of United States Steel Corporation of Delaware, was recently elected president and a director of Geneva Steel Company, United States Steel subsidiary, recently organized to operate the new \$180,000,000 Defense Plant Corporation steel works at Geneva, Utah.

Walter J. Tuohy, vice president of the Chesapeake & Ohio Railway Co., and former president of the Globe Coal Co., Chicago, was recently named associate deputy coal mines administrator. He will serve under Deputy Administrator Carl E. Newton in directing work to achieve maximum production under government control of the nation's coal mines. The Department of the Interior also appointed the following men as division chiefs: Huston St. Clair, Tazewell, Va.; H. J. Connally, of Clark's Summit, Pa., and Duncan Kennedy, of Charleston, W. Va.

George C. Heikes, formerly director of the zinc branch, War Production Board, Washington, D. C., has been appointed manager of the Takoma Aluminum Refinery of the Olin Corp., Takoma, Wash.

Harry L. Copher is now general superintendent in charge of mining operations at the Pyramid Coal Corp. **B. H. Schull** is vice president of the company.

Edward Thornton, formerly vice president-general manager of Krome Corp., Marshfield, Oreg., has resigned his position with that company and is now making his headquarters at 1440 Bryan Ave., Salt Lake City, Utah.

George McKay has been advanced from foreman to superintendent of the Blossburg "E" mine of the Brookside-Pratt Mining Co. in Alabama. He succeeds L. A. Kelly, who is now general superintendent of mines.

Malcolm C. Brown, formerly mining engineer, Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho, recently left his position to become assistant superintendent of the Sidney Mining Co., Kellogg, Idaho.

C. R. Humphrey has been appointed district mine inspector for the West Virginia Department of Mines. He succeeds Lawrence Loud, who recently resigned.

Henning Marstrander, mining engineer, is now a member of the Bureau of Mines' staff conducting a survey of coal mines in Alaska.

J. C. Heilman has been appointed mine superintendent for the United Zinc Smelting Corporation in the Tri-State mining area. He was formerly mining engineer for the Kansas Explorations, Inc.

Attorney H. J. Connolly of Clark's Summit, president of the Pennsylvania Coal Co., Scranton, was appointed a deputy administrator of the anthracite coal mines under Solid Fuels Coordinator Harold L. Ickes. He will spend some time in Washington, but retain his position as president of the Pennsylvania Coal Company.

Announcement of the election of **C. T. Ruhf** as president of Mack Trucks, Inc., has been made by Louis G. Bisell, chairman of the board, at a reg-



ular meeting of the board of directors. He has been with Mack since 1912.

Mr. Ruhf had been executive vice president of Mack since last January, following the death of E. C. Fink, former president and board chairman. Prior to that time he had been operating vice president in charge of factories.

Geo. A. Roos, general manager, Philadelphia and Reading Coal & Iron Co., Pottsville, Pa., announced these promotions in his operating organization: E. S. Christ, promoted to the position of assistant general manager. He was formerly superintendent of Mahonoy City Colliery. **Wm. E. Muehlhof**, formerly mining engineer, now chief engineer in charge of all the engineering activities. **C. E. Brown** was made mining engineer, formerly division engineer, Locust Summit Division. **G. J. Clark** promoted from assistant division engineer of the Locust Summit Division to division engineer

of that area. D. E. Ingersoll, formerly superintendent of the Oak Hill Colliery Co., now division superintendent of the Pottsville Division. Ronald Culton, foreman of Reliance Colliery, made superintendent of the Mahonoy City Colliery. G. A. Schnee was promoted to the position of assistant division engineer of the Locust Summit Division.

On leave of absence for the past year in performance of a special assignment for one of the country's largest motor freight lines, Tom Collins has rejoined the Cummins Engine Company, manufacturers of Cummins



Diesels, in his former capacity of manager of the company's Pacific southern region.

Announcement of Collins' return was made by P. E. Letsinger, vice president in charge of distribution, at Columbus, Ind., site of the company's factory and general offices. Mr. Collins will make his headquarters at the new regional offices which have been established at 411 W. Fifth Street, Los Angeles.

Ward C. Ball, personnel and safety director for the Federal Mining & Smelting Co., was recently made assistant district superintendent, according to an announcement by L. G. Johnson, district superintendent of the company's operations, in the Tri-State area. Mr. Ball succeeds Carl K. Carmean, who resigned on August 1 to become associated with the Cooley Brothers in the development of an open pit lead-zinc mine at Webb City.

J. H. Buehler, who has served as manager for the Bristol Silver Mines Co., near Pioche, Nev., was recently made general manager of operations.

Lane W. Hildreth recently resigned as chief of the Mining Machinery Section of the Mining Division, WPB. He has been succeeded by Leslie M. Case, former deputy chief of the Mining Machinery Section, who was with Worthington Pump and Machinery Company before joining the Division in March, 1943.

Paul Dietz has been appointed export sales manager for the general machinery division of the Allis-Chalmers Manufacturing Company, it was announced recently by William C. Johnson, general sales manager of the company.

Grant Stauffer, president, Hume Sinclair Mining Company, was recently elected a member of the board of directors of the Wabash Railroad.

Francis O. Clukies has joined the sales staff of Robins Conveyors, Inc., Passaic, N. J., engineers, manufacturers and erectors of materials handling machinery. Mr. Clukies will specialize in products of the Mead-Morrison Division. He was with the Mead-Morrison Mfg. Co., for some 30 years, before Robins bought out the materials handling end of that company.

J. H. Marsman & Co., recently announced its entry into the field of engineering and management on the

Pacific Coast, with offices at 2504 Russ Bldg., San Francisco. J. O. Enberg is president, George C. Dankwerth, vice president; S. G. Sargent, treasurer. The engineering department will be in charge of E. E. Enrich. E. M. Shelton will be in charge of the various agencies presented by the company, and M. C. Friel is chief engineer. R. J. Heinrich, formerly of the Consolidated Mining Company at Baguio, Philippine Islands, is also associated with the company.

L. C. Whittaker, former distribution officer of WPB's Mining Division, has been appointed assistant director for staff. The Division now has two assistant directors, the other being Dr. F. Stuart Miller with the title of Assistant Director for Operations. Mr. Whittaker now serves as liaison between the Mining Division and other WPB divisions as well as various other governmental agencies. Dr. Miller continues in charge of quotas, allotments and the internal working procedures of the division.

— Obituaries —

Christopher Leslie Bruns, mining engineer, is reported to have died recently at the Japanese prison camp at Santo Tomas, Philippine Islands.

Thomas A. Stroup, 54, assistant vice president of the West Virginia Coal and Coke Corporation, died August 27



at Elkins, W. Va., following a sudden illness during a trip to the company's northern properties. Mr. Stroup was one of the leading mining engineers of the state and was a recognized authority on coal formations and mining practices. Following graduation from the Missouri School of Mines he spent several years in general engineering and operating work, was connected with the Potash Geological Mineral Producers Corporation for two years, served as superintendent for the Utah Fuel Company from 1918 to 1923 and as engineer for the Fairmont Mining Machinery Company from 1923 until his appointment as chief engineer of the West Virginia Coal and Coke Company in 1926.

C. W. Waterman, Sr., 65, widely-known throughout the coal industry, and associated with the McNally Pittsburgh Manufacturing Corporation for the past 25 years, died in Chicago on August 7, following an illness of three days. Death is believed to have resulted from a heart ailment.

Mr. Waterman first became connected with the coal industry when he entered the employ of the Western Coal & Mining Co., working in the accounting department and later entering the engineering field. He later joined the Ira Fleming interests as general superintendent of mines located at Radley and in the Scammon area.

In 1914, Mr. Waterman was one of the organizers of the General Machinery & Supply Co. He later left the company to again enter the coal business and formed the Barton Ridge Coal Co., which did strip mining near Liberal. After the company's holdings were worked out, Mr. Waterman became associated with the McNally firm and was first vice president of the company in charge of sales.

Albion James Wadhams, 68, of Don gan Hills, Staten Island, N. Y., a vice president and manager of the Development and Research Division of The International Nickel Company, Inc., in New York, died at his summer home at Elizabethtown, N. Y., on August 22, of a heart attack.

Edward Warren Stahle, well-known engineer of the Hudson Coal Company of Scranton, died recently. He was a member of the Society of Professional Engineers of Pennsylvania.

News and Views

Eastern



States

WEST VIRGINIA

»»» Some light on that interesting question "What did the May and June coal strikes cost the strikers?" is gleaned from the following comments. An answer can be analyzed to a close degree by a study of the earnings of employees working in January, 1943, on a five-day week basis and of workers during March, 1943, when the six-day week was the time basis, with time and one-half and rate and one-half for the extra day.

The first comparison is made with employees, 9,826 being the figure for the January period and 9,986 for March. In January the 9,826 men had an average earning of \$158.94. The 9,986 men in March averaged \$204.88, or \$45.94 more than the January earning, by reason of the increased working time and the time and one-half pay. The \$45.94 covers an increased opportunity to work of four days for an approximate \$11.18 per day.

There is no reason to believe the higher earning per man made in March over January would not have been present in May and June when the general stoppage of work occurred and 11 days of production were lost to the workers. Two of the 11 days were worth \$11.18 per day. Nine days cost the workers \$7.46.

In the Kanawha district, for example, there are approximately 15,000 men under the influence of the union. Two days for this number at \$11.18 is \$335,400. Nine days at \$7.46 is \$1,007,100 or a total cost to the workers for the May and June shutdowns of \$1,342,500 in this district alone, exclusive of miscellaneous strikes at individual mines not encompassed by the general stoppage.

The State Department of Mines in

West Virginia lists 109,570 in 1942 as the number of men working under union contract, so the losses to the union members in May and June would be two days at \$11.18 and nine days at \$7.46 for 109,570 men, or a total of \$9,806,513 loss to the miners in West Virginia alone.

News items that have been prominent during the shutdowns placed the United States total idleness at from

400,000 to 450,000 men. Split the difference and take 425,000 men at \$11.18 for the extra days at time and one-half and the nine days at average straight time, \$7.46, and the result is something to really think about. The astonishing result, \$38,037,500, would have purchased quite a flock of war bonds and the workers would have been much better off.

These are the results based on actual payroll surveys of payroll entries and present an amazing result that should have the sober consideration of every union employee.

»»» The M. A. Hanna Company recently acquired 5,400 acres in the Round Bottom section near the coal mining district of Moundsville, W. Va., south of Wheeling.



Ickes beside himself

- TIMES-HERALD, WASH., D. C.



The St. Nicholas breaker of the Philadelphia and Reading Coal & Iron Co.

PENNSYLVANIA

»»» For over 20 weeks conferences have been held and agreements reached on many matters, but the major problem, wage rates, still remains to be solved between the United Mine Workers and anthracite operators. Under the circumstances, there was no recourse but to report to the War Labor Board the inability of the conferees to agree. Hearings will be held before the Board and it is hoped that a decision will be reached agreeable to both parties.

»»» Solid Fuels Administrator H. L. Ickes has appointed this Anthracite Distribution Committee: Producers—G. C. Cooke, W. L. Bonta, R. L. Birtley. Wholesalers—Louis Gulotta, G. N. Snider. Dealers—E. Robbie, H. O. Tompkins, J. Schreiber. Regional offices will be opened in New York City, Philadelphia, Boston, Syracuse and Wilkes Barre. Paid, full-time employees of the Solid Fuels Administration will run these offices. It has

been announced that the amount of anthracite going to dealers will be limited to 90 percent of that shipped in the coal year 1942-43. The balance over 90 percent will take care of conversions from other fuels.

»»» Secretary of Mines, Richard Maize, reports considerable progress in closing bootleg holes. They are being closed at the rate of 18 per day, now there are less than 700

holes in operation as compared with 2,000 not so long ago.

»»» The Glen Alden Coal Company's directors ordered a 40-cent dividend to be paid to stockholders of record, August 27. This is the third dividend this year, and it brings the total for the period to \$1.20 per share.

»»» Ninety-seven anthracite mine workers lost their lives during the first six months of this year as reported by the State Department of Mines. There were produced 286,443 tons per fatal accident, which according to Deputy Secretary J. J. Walsh "is not praiseworthy."

»»» Employment in the anthracite industry dropped 14,202 between January 1, 1942 and July 1, 1943, due to induction of workers into the armed forces, departure of miners to war plant jobs and other turnovers in the labor supply. Such was the result of a detailed report compiled by the War Manpower Commission. The decline in employment was especially heavy in the Scranton area where, during an 18-month period, there was a drop in those employed of 4,600.

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»»» As the summer advances, the industry finds barley coal not in demand. Many operators are storing it at the mines for the expected future demand. Efforts are being made by regional federal manager, J. J. Forbes, to help the situation.

»»» First-aid teams of the Hudson Coal Company's 12 operations held their annual contest in Scranton on August 21. An address was made by J. J. Forbes, federal regional manager of the industry, who was also chief judge of the contest. Cadwalader Evans, Jr., vice president of the Hudson Coal Company, announced the winner of the contest which was the team from Gravity Slope with a score of 99.93 percent. The runner-up was Marvine Colliery which scored 99.80 percent.

»»» At the Joint Fuels Conference of the American Institute of Mining Engineers and American Society of Mechanical Engineers to be held at the William Penn Hotel, Pittsburgh, Pa., on Thursday and Friday, October 28 and 29, the following four technical sessions are scheduled: Coal Research, Mining Management, Oil and Gas, and the War Program as it pertains to fuels. "Coal Faces Post-War Adjustment," by R. M. Weidenhammer of Brookings Institution, and "Laboratory and Field Tests on Coal-in-Oil Fuels," by J. F. Barkley and L. R. Burdick of the U. S. Bureau of Mines, and A. B. Hersberger of Atlantic Refining Co., are only two of the many papers included in the program. A banquet will be held Thursday evening at which prominent guests will be presented.

ALABAMA

»»» The general mining situation in Alabama seems to have improved somewhat as operations are moving along in steady manner. Coal production was curtailed for a few weeks, however, through the closing down of the Praco mine in the Birmingham district of the Alabama By-Products Corp., because a fire destroyed the top house and tipple. Considerable damage was also done to machinery. This has been repaired and operations are again under way.

»»» The Bituminous Coal Producers Advisory Board, recently appointed by Administrator Ickes, include a predominate number of Alabama operators, from District 13, which comprises all coal mining counties in Alabama, three in Georgia and 10 in Tennessee. This board is to furnish information and advice to the Solid Fuels Administration, on problems of production and distribution from this area.

»»» The iron ore mines are running virtually at capacity and furnaces are producing pig iron with little delay. The large plant of the Republic Corporation, at their Spaulding mine, near Birmingham, is running smoothly and the ore from this property is being delivered to their Thomas furnace about six miles away by means of trucks.

»»» The tin-bearing deposits in Coosa County, Ala., have been examined by geologists of the U. S. Geological Survey in the course of its search for domestic sources of this highly strategic metal.

The Coosa County deposits are located in the general vicinity of the towns of Rockford and Goodwater in pegmatite dikes and quartz veins which lie within the Wedowee mica schist belt in the Piedmont region. The pegmatite and quartz bodies are in the form of pipes, lenses, and dikes trending in a general northeast direction. The tin is in the form of cassiterite (tin oxide).

The occurrence of tin in this region has been known for many years. Available records indicate that about four tons of metallic tin has been produced to July 1943. At the present time Mineral Concentrates, Inc., is ex-

ploring a group of claims known as the Millsite, Two Bit, and South 1,400. A mill built in 1941 on the Millsite claims by the former owners, Coosa Cassiterite Corporation, has been reconditioned, and a series of bulk samples are being tested to determine the grade of the deposits and the amenability of the material to available recovery methods. The work is being carried out under the auspices of the War Production Board, financed by a loan from the Reconstruction Finance Corporation.

OHIO

»»» A new library on welding, believed the most extensive in existence and one which will be of inestimable value in welding development, particularly in the industrial field, has been established at the Ohio State University, according to Mr. E. N. Manchester, university librarian. Known as the "A. F. Davis Welding Library," it is the gift of A. F. Davis, vice president and secretary, The Lincoln Electric Company, Cleveland, Ohio. Mr. Davis received the degree of M.E. in electrical engineering from the university in 1914 and his reason for placing the library there was the fact that Ohio State has the only four-year course in welding engineering.

I-T-E and the Mining Field

Developments of the past ten years in mining methods have led to a very wide use of I-T-E air-immersed circuit breakers and switchgear. Consistent study of mining problems has kept I-T-E in the forefront with the result that I-T-E equipment has been a vital factor in mechanized practices.

Automatic Reclosing Circuit Breakers

I-T-E automatic reclosing circuit breakers with load measuring characteristics are widely used in mines where d-c trolley and feeder systems are employed and where overload peaks and faults arise frequently. Type KSA is for substation use in protecting and controlling semi-automatic or full automatic M-G sets, rotary converters and mercury-arc rectifiers. Type KSC is used in sectionalizing service to localize faults. Sectionalizing provides for maximum production at reduced cost for power, for electrical maintenance and machine repairs.

Fig. 1

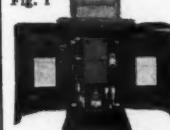


Fig. 1 (left) is a Type KSC automatic reclosing circuit breaker for sectionalizing service. Switch is shown open. Fig. 2 (right) shows a Type KSA automatic reclosing circuit breaker for substation service.



Fig. 2

Load Distributors

Type LDR Load Distributor, panel mounted, in glass front, dust-proof cover.

Fig. 3

I-T-E Type LDR Load Distributor improves service from two or more M-G sets or rotary converters in parallel on same system but widely separated. Generator loads are balanced to prevent over-heating, outages are reduced, peaks are limited and life of system and connected equipment prolonged.

Automatic Switchboards for Mines

I-T-E has designed and built many switchboards in recent years for semi-automatic or full-automatic protection and control in connection with local generating systems or purchased energy. The switchboards are for service with M-G sets, rotary converters and mercury-arc rectifiers. Much of the equipment, including circuit breakers and protective relays, has been designed specifically for mining service. Counting is simplified and there is much flexibility in space arrangements. A typical installation is at right, above. (Fig. 4.)



Representatives in
Principal Mining Areas
I-T-E
CIRCUIT BREAKER CO.
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Central



States

MINNESOTA

»»» Great Lakes iron ore carriers in July moved 13,588,814 tons of ore from upper to lower Lake ports and wiped out part of the deficit which the season's late opening placed on the 1943 record. This tonnage marks the greatest month in the history of their operations.

The total is still 8,974,968 long tons behind the mark recorded at this time last year, the carriers nevertheless are in a favorable position to meet this season's goal, recently reduced by the War Production Board from 91 million tons to 86.5 million tons.

The July record ore movement exceeded the previous all-time high, established in July of last year, by 183,406 tons. The new high was achieved despite the fact that the carriers, at ODT direction, moved both the July and the August quotas of grain.

MICHIGAN

»»» O. W. Terry, mining engineer with the Minneapolis office of the U. S. Bureau of Mines visited the iron ranges of Michigan and Wisconsin in August. The Bureau of Mines has been given an appropriation of \$2,000,000 for studies, surveys, metallurgical work pertaining to the development of iron ores and other ores and minerals used in the manufacture of steel. On his trip to Michigan and Wisconsin Mr. Terry investigated the possibilities of work by the Bureau of Mines in this area under this appropriation.

»»» A portion of the reclamation plant of the Calumet and Hecla Consolidated Copper Co. at Lake Linden has been converted to a use that was not contemplated in the original design but which is very important at this particular time. Some of the tanks which were formerly used to hold the sand in the ammonia leaching process are now filled with copper covered steel scrap that is left over from the manufacture of cartridge and shell cases. The same procedure is followed for the removal of the copper from the steel that is used to take the copper out of the sand that was taken out of the old tailing piles. The result

is the recovery of the copper from this mill scrap and a return of the steel to the furnaces.

»»» The Lake Shore Engineering Co., of Marquette, Mich., manufacturers of mining machinery was awarded the Maritime "M" on August 14. The presentation of the flag to F. A. Flodin was witnessed by a large group of mining men from the Michigan and Minnesota mining districts.

»»» The Clarence B. Randall reached Marquette on her maiden voyage on July 19 to take on a cargo of iron ore for the furnaces of the Inland Steel Co. Mr. Randall, for whom the boat was named, was an attorney at Ishpeming on the Marquette Iron Range before going to Chicago as vice president of the Inland Steel Co.

»»» A seminar in aerial photogrammetry was held at Michigan State College in East Lansing on August 16-17-18. This meeting was sponsored by the Society for the Promotion of Engineering Education and the Civil Engineering Department of the Michigan State College. An attendance of about 150 considered the problems of aerial mapping, both for military and civil purposes. The advances in the methods, equipment and results, many of them due to developments made during the war, have been such that it was predicted at the meeting that both geologists and mining engineers will use this method of mapping a great deal in the future.

»»» Mining of copper started about 100 years ago in the Upper Peninsula of Michigan. On August 28 and 29 appropriate ceremonies commemorating this event were held at Calumet on the first day and at Houghton on the 29th. Officials of the Calumet and Hecla Mining Corporation and representatives from labor, the Army, War Production Board, and the War Manpower Commission participated in the program.

ILLINOIS

»»» The National Safety Congress will mark one of the most important milestones in the entire history of the accident prevention movement at its meeting in Chicago, October 5, 6, and 7. Last year's Congress started the machinery of the nation-wide drive to save manpower for warpower. With that campaign in high gear this year's program is devoted exclusively to accident problems which have a direct bearing on prosecution of the war and winning it.

The National Safety Congress, which is the annual convention of members of the Council and other safety leaders in the military, agricultural, industrial and civilian life of the country, actually is 26 conventions within a convention. The 5,700 corporate and other members of the Council are classified in 26 membership sections, according to type of industrial enterprise represented by each member. Each of these 26 sections conducts its own Congress program, thus bringing purposeful emphasis to the particular accident problems current in every kind of industry. Cutting across interest in all sections, will be many subject sessions, covering problems that confront all industries. Paper of interest to the coal, metal and non-metallic mining industries by outstanding authorities are scheduled on the program.



Mine No. 43 of the Peabody Coal Co., Harrisburg, Ill.

MISSOURI

» » » Late in August the new Hunter mill of the American Zinc, Lead & Smelting Company started operations at Aurora. Capacity of the plant is from 30 to 35 tons of ore per hour. The major equipment in the plant consists of an 18-in. jaw crusher, two 4-cell roughers, a 7-cell cleaner unit, six vibrating tables, and a large Denver Sub A flotation machine and a 50-ft. thickener. R. E. Calhoun is assistant district manager of the company, with headquarters at Joplin; Vern Yates is in charge of the mill and Patrick Medley is mine foreman. John J. Inman, Webb City, is district manager of the company's operations.

» » » More than 60 applications for wage increases affecting around 5,000 mine and mill employees had been received by the end of August by a special Tri-State non-ferrous panel of the Kansas City Regional War Labor Board. Up to the third week in August, Judge Vinson, Director of Economic Stabilization, approved wage adjustments for nearly 1,500 workers in the Tri-State district. The War Labor Board directed certain companies to grant a 50-cent general wage increase per shift and that the piece-rate system be increased by 1 cent per can; the night shift differential was established at 25 cents additional pay. These increased rates were made re-

troactive by the following companies: St. Louis Mining & Smelting, September 17, 1942; Federal Mining & Smelting, August 25, 1942; Kansas Exploration and Oronogo Mutual, October 1, 1942; and Fenix & Sons, January 6, 1943.

The special Tri-State non-ferrous panel of the Kansas City Regional War Labor Board had been set up following its authorization by the National War Labor Board to permit all Tri-State mine operators to increase wages of miners up to 50 cents a day. The NWLB delegated this authority to the district board following the approval of Economic Stabilization Director Vinson of a 50-cent a day pay increase, which was recommended by the Non-Ferrous Metals Commission after a wage boost hearing between five unionized district companies and their employees union locals.

KANSAS

» » » The head frame and hopper from the HH & H lease, near Baxter Springs, Kans., has been moved to a new shaft recently sunk on the Stoskopf lease. The Eagle-Picher Mining and Smelting Company, acting as agents for the Metals Reserve Company is in charge of operations. A new road has been constructed to the shaft and low-grade ore will be brought to the Eagle-Picher Paxton mill by trucks.

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SPROCKETS	<input type="checkbox"/>
CHAINS	<input type="checkbox"/>
FLIGHTS	<input type="checkbox"/>
PANS	<input type="checkbox"/>
BEARINGS	<input type="checkbox"/>
SHAFTING	<input type="checkbox"/>

HOISTS

DRUMS	<input type="checkbox"/>
SHAFTING	<input type="checkbox"/>
SPIDERS	<input type="checkbox"/>
MOTORS	<input type="checkbox"/>
ENGINE PARTS	<input type="checkbox"/>
CABLES	<input type="checkbox"/>

RETARDERS

DRUMS	<input type="checkbox"/>
SHAFTING	<input type="checkbox"/>
BEARINGS	<input type="checkbox"/>
CABLES	<input type="checkbox"/>

ELEVATORS

SPROCKETS	<input type="checkbox"/>
CHAINS	<input type="checkbox"/>
BUCKETS	<input type="checkbox"/>
CASING	<input type="checkbox"/>
BEARINGS	<input type="checkbox"/>
SHAFTING	<input type="checkbox"/>

SHAKERS

SCREENS	<input type="checkbox"/>
HANGERS	<input type="checkbox"/>
BEARINGS	<input type="checkbox"/>
SHAFTING	<input type="checkbox"/>
ECCENTRICS	<input type="checkbox"/>
DRIVES	<input type="checkbox"/>

CAGES

BAIL	<input type="checkbox"/>
PLATFORM	<input type="checkbox"/>

SHEAVE WHEELS

SHAFTS	<input type="checkbox"/>
BEARINGS	<input type="checkbox"/>

ROBT. HOLMES and BROS., INC.
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Western

States



COLORADO

»»» On August 7 the Golden Cycle Corporation, Colorado Springs, was granted permission to continue gold mining operations at Cripple Creek for an indefinite period. The company has converted the flotation section of its mill near Colorado Springs and is now treating zinc-lead ores. In order to properly treat these ores it is necessary to have a supply of silicious ores constantly available going through the mill and the gold mines of the Cripple Creek district, now operating on a curtailed basis, is the only nearby source of this silicious ore. The plant is currently treating about 300 tons of zinc-lead ore a day.

»»» To provide the war program with additional zinc, a drainage tunnel will be driven near Leadville, Colo., for the purpose of dewatering several flooded mines in the Leadville district. The project has been approved by Congress and signed by the President allowing appropriations for \$1,400,000 for the completion of the project. The main tunnel is expected to be driven 13,410 ft. with three laterals totaling a little over 6,000 ft. in length. The project is expected to take around a year for completion and it will probably be a year and a half to two years before the mines will be dewatered and will be in production. A lateral from the tunnel known as the Downtown will be driven to the Penrose shaft, a distance of about 2,600 ft.; the lateral to the Chrysolite, draining the Friar Hill mining area will be about 1,000 ft.; and the lateral from the Pyrenees to the Tucson shaft will be around 2,400 ft. long. The work is under supervision of the U. S. Bureau of Mines with Louis K. Jacobsen, 212 Security Bldg., Denver, in charge as district engineer for the Bureau.

NEW MEXICO

»»» For several months New Mexico oil production has increased slightly, but new prospecting has been slow. Now, however, John M. Kelly, state geologist, reports the greatest oil wildcatting activity in six years, listing 16 new well drillings in six counties, with some so-called deep

tests. With the beginning of the war and restrictions on equipment and materials, it became almost impossible to continue wildcatting. The oil industry was in advance of the government in urging that steps be taken to relax restrictions and permit opening of new fields. State Geologist Kelly says that New Mexico has many potential fields which can be developed, and many favorable locations for wildcatting.

»»» New Mexico industry has set a new production record and recognition for this achievement has been given the Carlsbad mining area. The three potash companies operating in southeastern New Mexico were recently awarded the Army and Navy "E." Awards were made in August to the United States Potash Co., the Potash Company of America and the International Minerals and Chemical Corporation. Previously, Chino Mines Division, Kennecott Copper Corporation, operating at Santa Rita and Hurley, had been awarded the Army and Navy "E." These awards were hailed by management and labor as a great achievement and a step forward in furthering industrial relationships in the southwest.

guns, tanks, and motorized machine gun units in action. The Army "show" was staged at Santa Rita, where production from the huge open pit mine of Chino Mines Division, Kennecott Copper Corporation is at capacity. Demonstrations were also held at the lead and zinc properties of the American Smelting and Refining Company, the United States Smelting, Refining and Mining Co., the Peru Mining Company, the New Mexico Consolidated Mining Company and the Black Hawk Consolidated Mines Company, all of which are producing at capacity to furnish metals vitally needed for war. Management and labor cooperated and played host to the 500 soldiers who put on the demonstration which was witnessed by more than 10,000 mine workers of the mining districts adjacent to Silver City.

»»» Mid-year unofficial figures for 1943 by major mining companies in New Mexico for production of critical and strategic metals urgently essential in the war effort reveal that total tonnages of copper, lead, zinc, molybdenum, fluorspar, manganese and potash will establish a new high record for the state. Despite an acute labor shortage in some districts, peak production is being maintained, and the demand for more skilled and unskilled labor has been at least partially relieved by the return to the mines of 250 furloughed soldiers, many of whom previously were engaged in mining.

ARIZONA

»»» In a tour of the principal copper mining camps in New Mexico and Arizona the first two weeks in August, a detachment of the Desert Training Command of the United States Army gave thousands of metal miners a close-up of actual combat in demonstrations of anti-aircraft

»»» Field engineers of the Arizona Department of Mineral Resources began a survey of manpower and materials consumption in the small mines of the state in early August, at request of federal officials in Washington, D. C. The state is



Main shaft and leaching plant of the Inspiration Consolidated Copper Company at Inspiration, Ariz.

divided into four districts by the state department, and the engineers will furnish district reports to J. S. Coupal, Phoenix, state director.

»»» Small mine operators throughout Arizona have been stirred by rumored federal action to close the small mines of the nation to provide increased numbers of employees for the large producing operators and to conserve materials used in mining operations.

Meetings to originate definite protest against the plan were held in Kingman and Prescott, in August. J. S. Coupal, state director of the Arizona Department of Mineral Resources, branded the plan not feasible and said that most of the miners from small properties would not go to work in the larger mines because they are older men, many of whom are physically unable to pass requirements for employment by the larger mining companies. Most have family ties in the section in which they are working; and many are health seekers, he has said. Coupal said that there are around 2,000 employees in the small metal mines of the state.

»»» Worker quotas from the 4,500 soldiers being released by the Army to work in western metal mines have been granted in 10 Arizona districts. Quota numbers for the various mines have been withheld. The men have been hired by mine representatives at Ft. Douglas, Utah. Arizona mines to benefit in the plan are: Inspiration mine (Anaconda Copper Co.), Miami; Bagdad Copper Co., Hillside; Castle Dome mine, Miami; Kennecott Copper Corp., Ray; Magma Copper Co., Superior; Miami Copper Co., Miami; and mines of the Phelps Dodge Corp., in Ajo, Bisbee, Jerome, and Morenci. Release of the soldiers for mine employment was made possible by the War Manpower Commission. The soldiers are hired on 90-day contracts; and they will not be returned to active Army duty unless they violate the conditions of their release.

»»» A pattern for 12 others to follow, the first of 13 rallies in major mining districts of the West to carry the message of increased mines production, was held on August 8, in Miami, Ariz. A unit of 550 men of the 81st Division, Field Artillery, staged the Miami show that drew 5,000 spectators. The rallies were planned coincident with the release of 4,500 soldiers, experienced in mining, to work in the mines of the West that are producing strategic war metals.

»»» The Miami, Ariz. plant of the International Smelting & Refining Co., and the Inspiration (Ariz.),

Copper Co., have been notified of the renewals of their Army-Navy "E" awards for excellence of production in wartime.

ble of producing in excess of 100 tons daily in combined operations, it is said.

»»» An option has been taken on the Arizona Magma mill at Chloride, by local mining men, who expect to give the county an outlet for base metal ores. They plan to recondition the mill and install selective flotation units to recover the lead, zinc, and copper from ores mined in the Chloride and Cerbat mining districts. Mines of the districts are capa-

»»» Deposits of lead and zinc in the Aravaipa area of Graham County have been recently made accessible, through the completion of eight miles of new road from the old Aravaipa headquarters to the following mines: Iron Cap, Headcenter, Arizona Shaft, and the Abe Reid mines. The improvement work has been carried on by the federal grazing service, the bureaus of public roads and mines, and the War Production Board.

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and all tamping guesswork and "take-a-chance-tamping" will be ended. They give the safest, surest shooting that more than meets all safety measures and give the shot-firer the easiest, quickest—all prepared—tamping ever used. Mines now using SEALTITE TAMPING BAGS have decreased tamping time and powder costs by increasing tonnage with more effective shooting.

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TAMPING BAG COMPANY
MT. VERNON, ILLINOIS

»»» Yavapai County notes: S. R. McBride of the Plymouth mine in Copper Basin reports a three-foot vein of manganese ore and is filing for a RFC loan for development. . . . J. A. Van Hook has secured a RFC loan on the Poverty claim a part of the old Davis Dunkirk. . . . The Gold Crown Mining Company in the Crown King district now employs from 25 to 30 men, and is operating the mill for approximately 30 tons daily, it is reported in Prescott by Mark Gemmill, superintendent. . . . Ore is coming from the Old Tiger mine on the Old Hammond and Riggs vein. . . . J. A. Poindexter of Groom Creek is unwatering his Silver King property under a RFC loan. . . . R. A. Airheart is cleaning a tunnel on the old Mt. Union, and is building a road to connect with the Tomlinson property. . . . Fred Gibbs is sampling the Loma Prieta and is diamond drilling the Copper Hill.

»»» Mica is to be mined in Arizona for the war effort, it is reported from Mohave County. Production is to start at the Mica Giant mine in Cottonwood canyon. The Mica Giant was located about 15 years ago by its present Owner, T. Mac Smith, then a resident of Kingman. Mining will be by open-pit method.

IDAHO

»»» Lucky Friday Silver-Lead Mining Co., operating a new property just outside the city limits of Mullan, have received from the Bunker Hill smelter net returns of \$12,956.88 on a shipment of 101 tons of concentrates. The ore was produced from development and prospecting operations. The company has a zero quota rating and in addition to the smelter settlement will receive premiums on both the lead and zinc which will bring the total receipts to over \$15,000 for the two cars. The Lucky Friday is one of the rare mining developments in the Coeur d'Alene district that has paid its own development expenses.

»»» The Coeur d'Alene mining district will receive about 600 of the 4,500 soldier mine workers to be furloughed by the government to help in the production of lead and zinc, according to Earl W. Greenough, of the field mining production division of the War Production Board. Only mines of the major producing class will be allowed to hire the furloughed men. This district is short about 1,000 miners and the mines have been working at about half capacity for several months.

»»» The Merger Mines Company has started sinking a 200 ft.

shaft on a lead-silver vein originally opened in a cross-cut from the 1,400 level of the Coeur d'Alene Mines shaft. The present work will give approximately 1,200 ft. depth on the vein, which proved to be from seven to 12 ft. wide and over 500 ft. in length where opened on the level.

»»» The mill building at the Littel Pittsburgh zinc mine on Pine creek was almost completely destroyed recently by a blast of five tons of dynamite which had been temporarily stored on the mine dump near the mill. Cause of the explosion was fire

originating in one of the mine buildings. The mill machinery was not injured to any extent and will again be in operation as soon as proper housing can be provided.

»»» For some time past the Bunker Hill M. & C. Company has been employing women workers in any capacity where they will fit in about the mine, mill and smelter workings of the company. It appeared the only practical solution to the labor shortage problem. So far women have been employed as office help, truck drivers and on the mine sorting belt.

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★ The ORIGINAL Deister Company • Inc. 1906



The Morning mill of the Federal Mining & Smelting Co. at Mullan, Idaho

»»» The Coeur d'Alene Mines Corp. has opened its vein of tetrahedrite (copper-silver-antimony) ore on the 2,000-foot level after driving a crosscut 800 ft. At the point of intersection the vein has a width of nine ft. containing high-grade milling ore. On upper levels the ore shoot has proved productive for 500 ft., between the Polaris and Mineral Point faults. The property is equipped with a 600-ton capacity flotation plant but has only been producing about 150 tons per day for several months because of the labor shortage. Concentrates from the plant are first treated for removal of the antimony at the new Sunshine electrolytic antimony plant, after which they are treated at the Bunker Hill smelter for copper and silver values. The ores carry higher copper values than any other mine in the silver belt.

»»» The Monitor Mining Co., a recent Day organization, is now the largest property owner in the Beaver district of the Coeur d'Alenes. The Monitor company has within the past year or so purchased 12 big groups of mining claims owned by former local stock companies, including the Ray Jefferson, Virginia Amazon-Manhattan, Blue Grouse, Tuscumbia, Idora, Sunshine Limited, Sunset Banner, Beaver Creek, Silver Tip, Sitting Bull and Parrott. None of the purchases involved money transactions but were made for stock in the Monitor company which was distributed pro rata among the stockholders of the older companies. The district has many zinc veins which, under conditions existing at the time of their development, were unprofitable to the owners but which are profitable under present conditions. The Monitor company, with government help, has constructed roads into the district and at present has several of the properties in production, trucking the ore to the Hercules custom mill in Wallace.

»»» The former gold mines of the Bradley interests in the Yellow Pine district of southeastern Idaho are now rated as the largest tungsten and antimony producers in the United States. From recently discovered deposits the company is said to be producing 700 tons of tungsten-antimony ore per day with open pit mining methods and will increase this capacity to 1,000 tons on completion of an electric power line now building and which will be 106 miles in length.

MONTANA

»»» The Nancy Lee Mining Co. an Idaho company operating the former Little Pittsburgh mine in Mineral County, Mont., is reported to have secured a \$20,000 government loan for the purpose of driving a cross-cut tunnel from the Nancy Lee lower tunnel to open the old King and Queen lead-silver vein, which is also owned by the Nancy Lee. The development is in Sloway gulch near the town of Keystone.

»»» The International Minerals & Chemical Corporation, Chicago, Ill., is reported to be rehabilitating the Douglass Creek phosphate mine near Hall, Mont. The property was originally opened by a Northern Pacific subsidiary in 1932. Louis Ware is president of the International Minerals & Chemical Corporation.

»»» Crystal Cutters, Inc., of Livingston, Mont., has been incorporated to mine, cut and polish calcite now being produced near Clyde Park. Dr. Harry Berman of the Geological Department of Harvard University, Charles Williams of Louisville, Ky., and Robert Hoffman, mining engineer and manager of operations have established headquarters in Livingston.

UTAH

»»» Completion of a deal whereby the Combined Metals Reduction Co., long a subsidiary of National Lead Co., becomes a separate operating unit, was announced in Salt Lake City this week. Combined Metals Reduction Company controls properties at Pioche, Nev.; Bingham, Utah; Hailey, Idaho; and reduction works at Bauer, Utah. National Lead formerly owned 75 percent of Combined Metals Reduction Co., while the remaining 25 percent was owned by Combined Metals, Inc. E. H. Snyder, Felt Bldg., Salt Lake City, Utah, is general manager of the company.

»»» Representatives of 38 western metal mines have been in Salt Lake City arranging for the hiring of 4,500 soldiers furloughed by the Army to return to the production of metals and to relieve a critical manpower shortage in the western mining industry. The furloughs became effective August 14 following release orders announced by the Army and the War Manpower Commission on July 19.

»»» A plan has been proposed and is being given consideration whereby the New Quincy Mining Co., owning properties in the Park City Mining region, Utah, would liquidate its indebtedness in exchange for a portion of its property. Under terms of the proposed deal, the New Quincy would relinquish part of the New Quincy property to the International Smelting & Refining Company for the release of a note held by the smelting company against New Quincy. This would leave the New Quincy the Little Bell ground, together with some other acreage.

»»» Strong support of a plan for government experimentation in the extraction of oil from shale and coal deposits of the intermountain states, particularly Utah, Wyoming and Colorado, was evidenced at a Senate sub-committee hearing held in Salt Lake City last month. A Senate bill, sponsored by Senator Joseph C. O'Mahoney of Wyoming, which would authorize the Bureau of Mines to proceed with such experimentation on a full-sized scale, is now under consideration. Witnesses cited the present critical situation, pointing out that the United States was relying wholly on limited reserve supplies of flowing oil. Michael W. Straus, first assistant secretary of the interior, stated that new discoveries of petroleum in 1942 amounted to 42 percent of the depletion in spite of government subsidy in wildcatting.

It was estimated that oil could be produced from Utah coal for less than

\$1 per barrel and from oil shale for less than \$2 per barrel. Valuable by-products were listed from coal such as smokeless fuel, plastics and lubricants, and it was pointed out that spent oil shale could be used in the manufacture of cement. B. P. Manley, executive secretary of the Utah Coal Operators' Association, expressed fear that the Senate bill might lead to government infringement on the domain of private industry, but did not object particularly to the experiment program.

»»» The new 250-ton leaching plant of the Ohio Copper Company, operating at the Big Indian copper property, southeast of LaSal, Utah, is expected to start operations early in October. Percy C. Kettle, Dooley Building, Salt Lake City, is president and general manager of the company.

»»» Members of the Bituminous Coal Producers Advisory Board recently appointed from the State of Utah are as follows: For the United Miners, Alfred Carey, Rock Springs, Wyo.; producers, L. E. Adams, Royal Coal Company; A. B. Foulger, Lion Coal Corporation; Mike Gambero, Lone Pine Coal Company; R. H. Hamer, Hi-Heat Coal Company; Mononi Heiner, Utah Fuel Company; Byron A. Howard, Deer Creek Coal mine; Paul F. Keyser, Independent Coal and Coke Company; F. S. Mulock, U. S. Fuel Company; M. N. McKinnon, American Fuel Company; E. K. Olson, Rio Grande Coal Company; LeRoy Rigby, Larson and Rigby mine; L. R. Weber, Liberty Fuel Company, and J. R. Sittorud, Oliphant Coal Company.

NEVADA

»»» The large new mill of the Manganese Ore Company on the shores of Lake Mead started operations during the latter part of August. The plant is owned by the Federal Government and represents an investment of about \$8,000,000. It is termed by Walter B. Hester, plant superintendent, as a "pilot plant for the manganese industry and the Government to determine whether medium grade manganese can be produced successfully in this country."

The mill is probably the largest of its kind in the State and is designed to handle 1,100 tons of manganese ore daily. It is located a quarter mile distant from the Three Kids Mine, owned by the M. A. Hanna Company of Cleveland, Ohio. More than 250,000 tons of ore are already in stockpiles adjacent to the first unit of the mill. The Three Kids property contains more than an estimated one million tons of low-grade ore.



A view of one end of the large open pit copper mine of Nevada Consolidated Copper Mining Company near Ruth, Nev.

»»» The M. G. L. Mining Corporation, operating a tungsten concentration mill in the Nightingale area, Pershing County, is treating a daily average of 150 tons of scheelite, although it is still short of men. When the mill was completed electric power was not available and the company installed three D-13000 Caterpillar power units. Water was obtained several miles distant by drilling wells in a dry lake area. Roy A. Hardy is consulting engineer for the company and Ray M. Henrickson is superintendent.

men the Army will release for mine work.

»»» Consolidated Coppermines Corporation of Kimberly has started stripping an area of ground near the Emma Nevada shaft preliminary to beginning open-pit mining operation on a small scale. Drilling in this area has been under way since late last year, and results obtained have encouraged the management to proceed with mining.

CALIFORNIA

»»» The employees and management of the New Idria Quicksilver Mining Company were recently awarded the Army-Navy Production "E."

Production of tungsten concentrates from placer operations at Cuddeback Lake in the Randsburg area, Kern County, is aiding materially in California's output of this strategic mineral. The Hoefling Bros. are operating two draglines and several large trucks for hauling tungsten concentrates from their washing plant. The Atolia Tung-Sun Mining Company recently completed its concentrator and is now in operation, producing concentrates, also from the Randsburg area. A small capacity power shovel digs the gravel which is hauled to the mill in trucks. A Pomona pump at the nearby Judge well provides the water for milling operations. W. H. Bickel is superintendent.

» » » The Old Penn Copper mine near Campo Seco, Calaveras County, is being dewatered by Los Angeles interests. At one time the property is

reported to have produced a substantial tonnage of copper ore. Roger Peet is superintendent in charge of operations.



The Sunrise iron mine of the Colorado Fuel & Iron Corporation at Sunrise, Wyo.

Serious Manpower Situation in Western Coal Mines Continues Without Relief

COAL MINING authorities in the State of Washington estimate that approximately 900 additional coal miners are needed to operate the coal mines in that State. For the last year mine officials have constantly been working and cooperating with the various government agencies for securing this needed manpower, but up to this time all efforts are reported to have failed to solve this problem.

Coal requirements in the northwest area comprising of Washington, Oregon and northern Idaho, on revised figures as of August 1, 1943, show that 4,581,000 tons of coal are needed for the period April 1, 1943 to March 31, 1944. It appears that the State of Washington's production after filling railroad orders will only amount to 1,000,000 tons, thus it can be seen that upwards of 4,500,000 tons must be brought into this area from outside the state (Idaho has no production, Oregon a negligible amount).

Working on a five-day per week basis, the State of Washington during the first five months of 1942 produced 874,605 tons while for the same period in 1943 and working on a six-day basis, production was only 699,491 tons. None of these months was affected by strikes. A six-month period for comparative purposes of 1942 and 1943 show, respectively, 1,045,208 tons and 791,301 tons. However, the month of

June, 1943, was affected by two mine shut-downs. Production per man shift for 1941 was 3.69 tons per man day and for 1942, 3.45 tons. It is believed that with the additional 900 men, production could be increased 4,500 tons per day based on a five-tonns-per-man-day basis for the new men secured. The manpower shortage in this area prohibits reopening of old mines or any extensive new developments.

» » » Coal producers and consumers in the western States are confronted with an additional burden through the recent order by Ickes prohibiting further shipments of coal from docks on the upper Great Lakes to Idaho, Montana, Oregon, Washington and Wyoming. North and South Dakota were not included in the order. This order became effective August 24.

» » » Among the western coal mining companies whose properties were recently returned, following the jurisdictional possession by the Federal Government, were as follows: Colorado and Utah Coal Company, Denver; Calumet Fuel Company, Somerset, Colo.; B. & R. Coal Company, Renton, Wash.; W. J. Kaiser Company, Sunnyside, Utah; Roundup Coal Mining Company, Roundup, Mont.; Colorado Fuel and Iron Corporation, Denver.

WYOMING

» » » In the first half of 1943 the Union Pacific Coal Company employed 1,693 persons with 1,603 separations, losing 52,168 man-days by voluntary absenteeism, costing in production of coal 409,405 tons. Efficiency during this six-months' period compared with the same period in 1942 declined 3.7 percent, that is, based on the relative number of tons per man-shift, 114,123 tons were lost, or a total loss incident to absenteeism and reduction in efficiency in the six-months' period of 523,528 tons.

Up to August 8, a minimum of 21 and a maximum of 106 persons per week have been employed with losses ranging from a minimum of 17 to a maximum of 90 per week. This year, for the period ending August 8, the company employed 2,063 men, losing 2,035, a net gain of 28 persons.

The Pacific northwest is not receiving coal in sufficient quantity from the western coal producing states. The weekly deficit for nine weeks ending July 31 averaged 348 cars. This situation is obtaining at a time when domestic, heating and railroad consumption should be at the low point.

Wheels

(Continued from page 48)

to the Solid Fuels Administration and the enforcement of maximum price regulations for bituminous coal has been taken over by the OPA. Operators of bituminous mines of over 50 tons daily capacity are required by the Solid Fuels Administration to report each month on the distribution of coal, the first report to cover July, August and September. Report forms call for detail of shipments by types of transportation, uses, and by destination.

The Solid Fuels Branch of OPA is requiring producers to file monthly cost forms for April, May, June and July, if this information has not been furnished to the Bituminous Coal Division. OPA has also issued regulations preserving the designations contained in the minimum price schedule of the Bituminous Coal Division with respect to coal classifications, sizes, groupings, mine index numbers, producers districts and sub-districts and all other trade appellations.

It is also required that where sales of bituminous coal are now being made at minimum prices established under the Guffey Act because such minimum prices exceed OPA maximum prices for the same coal, this practice may be continued only until October 23, 1943. Producers may petition OPA for a higher ceiling price if they would suffer hardship in being forced to revert to the lower maximum prices set by the OPA.

WLB Powers Increase

An Executive order issued in mid-August strengthened the powers of the War Labor Board in securing compliance with its directives, by providing for the exercise of sanctions against unions and employers. Upon the reporting of a case of noncompliance by the WLB to the Office of Economic Stabilization, the Director of OES initiates the application of appropriate sanctions.

In the case of an employer, the Director may cause the withholding of priorities, Government contracts, transportation facilities, fuel or other privileges.

In the case of a union, the plant or mine, if not already in Government possession, would be taken over by Government and the Government agency in charge would immediately be directed to apply to WLB, under Section 5 of the War Labor Disputes Act, for an order withholding any benefits under the terms or conditions of employment then in effect, such as the check-off of union dues. All dues collected during such a period would be held in escrow and delivered to the union only upon its compliance with WLB's orders.

In the case of an individual, the Director would cause the War Manpower Commission to modify or cancel draft deferment, employment privileges, or both, and the Attorney General might proceed against him under the criminal penalties of the War Labor Disputes Act.

Coal Wage Decisions

The War Labor Board decision on the Illinois wage agreement was handed down on August 25 disapproving the \$1.25 a day portal to portal pay provision. WLB stated that the \$1.25 a day settlement covering all back claims for travel pay did not constitute "a genuine settlement of alleged claims arising under the Fair Labor Standards Act."

WLB Chairman Davis stated that the Board had considered the miner's portal to portal claims in their relation to the Fair Labor Standards Act, under which there could be no claim for payment unless time underground exceeded 40 hours a week, and that no evidence had been presented to show how much if any time had been worked in excess of 40 hours. That part of the Illinois agreement providing for an eight-hour day with overtime pay for the eighth hour together with vacation pay and allowances for tools, lamps, etc., was approved by the Board.

Meanwhile the United Mine Workers in the Birmingham district have filed suit to recover travel time pay for some 22,000 miners extending back to October 24, 1938. Also pending in the Federal District Court in Roanoke, Va., is the case of the Jewell

Ridge Coal Corporation in which declaratory judgment is asked on the question of portal to portal pay for coal miners. The plaintiff company asked the court to hold that travel time is not time worked under the Fair Labor Standards Act.

Eight Hours at Coal Mines

The War Labor Board has authorized the working of an eight-hour day in the country's coal mines and Federal Coal Mines Administration officials have discussed with leading coal producers the institution of an eight-hour day program to increase wartime production. There are a number of complex problems in connection with the application of an eight-hour working schedule to the various mining districts including the anthracite industry. The Coal Mines Administration is likewise conferring with representatives of the mine workers and it is also recognized that higher maximum prices to meet increased costs would have to be provided by the OPA.

Government Releases Mines

Under the requirement of the War Labor Disputes Act that property seized by the Government be returned within 60 days after restoration of productive efficiency, Secretary Ickes on August 23 announced the return of possession and control of 687 bituminous coal mining companies to their owners. The orders for the return of the mines whose production had been impaired stated that the Federal operating managers have submitted evidence showing that productive efficiency "prevailing prior to the taking of possession of the Government has been restored."

Approved Equipment

(Continued from page 31)

96. Type No. 163 "tractor truck"; two motors, 10 and 1½-hp., 250 volts, D. C. Approval 456 issued to the Goodman Manufacturing Co., August 19, 1942.

97. Type 712-CC shortwall mining machine; 35-hp. motor, 500 volts, D. C. Approval 464A issued to the Goodman Manufacturing Co., November 24, 1942.

Rock-Dusting Machines

17. Type SD rock-dusting machine; 10-hp. motor, 230 volts, D. C. Approval 446 issued to the American Mine Door Co., March 31, 1942.

Miscellaneous Electric Mine Lamps

(Approved Under Schedules 10A, 10B, and 10C)

18. Justrite models 63-S, 64-S, and 65-S emergency dry-cell lamp, cap type. Approval 1022 issued to the Justrite Manufacturing Co., May 5, 1942.

Permissible Single-Shot Blasting Units

(Approved Under Schedules 12, 12A, and 12B)

18. M. S. A. model P single-shot blasting unit (Edison Model P cap lamp with blasting attachment). Approval 1223 issued to the Mine Safety Appliances Co., September 2, 1942.

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Practical Booklets on Supervisory Problems

To help industrial foremen meet wartime demands and solve some of the problems of human relationship among employes which have arisen in industry, seven practical pocket-size booklets on such problems are published by Elliott Service Company, 219 East 44th Street, New York City, and distributed by them. They are written by Glen Gardiner, an authority on foremanship training and industrial relations, and a brief description of each booklet follows:

How to Train Workers Quickly: A Manual for Training Men and Women in Wartime.

How to Handle Grievances: This short manual is said to serve as a guide for good supervisory practice and labor relations.

How to Create Job Satisfaction: A manpower maintenance manual for foremen, which is also said to relate how to build a group that pulls together. Many other problems are discussed and solutions offered.

How to Cut Waste: This booklet provides the foreman with a 4-step plan to cut waste.

How to Get Out More Work: The reader is said to find much useful information showing him how to study his present job methods, how to plan his work, and how to develop better methods for doing each job.

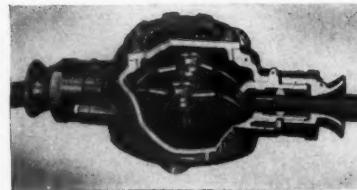
How to Correct Workers: The text is constructive and is written with the viewpoint that workers who get "off the beam" must tactfully and effectively be corrected so that quality and quantity production can be maintained.

Qualities of a Good Boss: A practical self-rating check-up for persons in supervisory positions.

New Gas-Proof Splice Box Announced

The Ohio Brass Company, Mansfield, Ohio, announces the development of a new explosion-proof connection box, known as the O-B type FG gas-proof splice box. Especially designed to sectionalize trailing cables in gaseous working areas, the device is said to offer a simple, rugged means of connecting three-conductor cables by means of heavy bolted terminals. It has been tested and approved by the U. S. Bureau of Mines.

The splice box consists principally of bolted terminals on dirigo spool insulators within a malleable iron case. The cable enters the case through a



Top.—Section view of the interior construction of type FG gas proof splice box



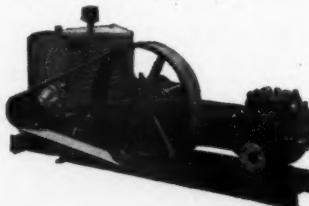
Below.—Type FG gas proof splice box

gasproof packing gland which is assembled and sealed to the end of the cable itself. This assembly is done only once, preferably in the mine shop. Thereafter the gland assembly remains with the cable and is attached to the case by two cap screws. Safety ground wire is soldered to the gland body and automatically makes the ground connection through the box casting. According to Ohio Brass, a safe, positive gasproof splice is thus effected with this device by tightening only six cap screws, two on each gland and one each on the positive and negative connections.

The splice box is provided with two mounting lugs permitting it to be spiked to a timber, keeping the cable off the bottom. Sizes are available handling three-conductor cables from No. 8 to No. 2/0.

Power Pump

A new duplex side pot pump designed and manufactured by the McGowan Pump Division of the Leyman Manufacturing Corporation, Cincinnati, Ohio, is announced by the company. Features of the unit include a 1,000-lb. working pressure, all mov-

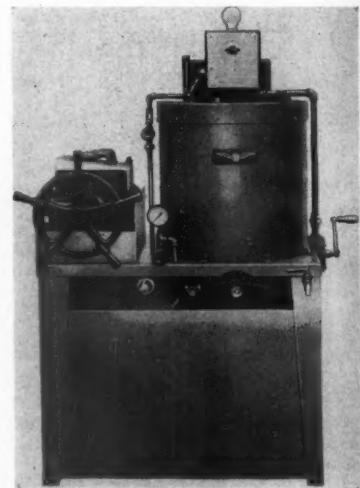


able parts totally enclosed, herringbone gears, and Timken roller bearings. It has a flanged suction connection on either side and double shaft extension. Bearing housings are said to be extremely large to provide easy maintenance, and interchangeable liners give optional capacities and pressures.

Small Capacity Oil Reclaimer

A new small capacity lubricating oil reclaimer, designed for small plants and organizations having their own fleet of trucks and motor cars, is now being manufactured by the Youngstown Miller Company, Sandusky, Ohio. In addition to reclaiming lubricating oils of the motor fleet, this reclaimer can usually handle a limited quantity of waste lubricating oils drained from equipment used in the plant or manufacturing processes of these companies.

With a capacity for purifying eight



gallons of dirty oil in 70 to 90 minutes, the manufacturer's model A-8 oil reclaimer is said to handle 2,500 gallons of waste lubricating oil per year when operated only once a day. It is pointed out that based on average prices for the new oil, the reclamation of this quantity will generally enable the machine to pay for itself in six to 12 months.

This machine has a two-stage filter press, is semi-automatic, operating under thermostatic control, and utilizes common refinery earths available on the open market. The man oper-

ating the machine can do so incident to his regular work.

For handling larger quantities of lubricating or hydraulic oils, the manufacturer offers seven other sizes of reclaimers.

High Speed Synchronous Motors

A new line of vertical high-speed, hollow-shaft synchronous motors has been announced by the Motor Division of the General Electric Company. Furnished in ratings from 100 to 1,000 hp., and in speeds from 514 to 1,800 r.p.m., these motors are especially desirable for pumping applications where a large volume of fluid is handled.

For protection, these motors have a dripproof enclosure. They are streamlined throughout to provide a pleasing appearance, and their smoothly contoured lines will not easily collect dirt and dust. The top cover of the motor is easily removed to permit adjustment of the pump shaft. In addition, easy access to the brushes and the collector rings is said to be obtained by simply unlatching a flush-mounted steel plate. The frames of these motors are of cast-iron construction, which provides strength to withstand the high-thrust loads often encountered in pump applications. The motors can be furnished with non-reverse ratchets to prevent reversal of pump rotation at shutdown or on starting. They are also available in solid-shaft construction.

Reversible Trolley Switch

A reversible type trolley switch with center feed connection, which can be changed to either right or left hand by merely adjusting two bolts in the assembly, has been perfected by the



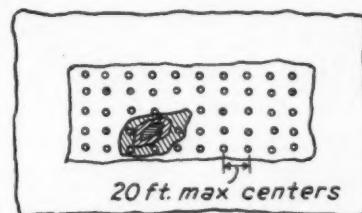
Mosebach Electric and Supply Company, 1152 Arlington Avenue, Pittsburgh 3, Pa. The incoming current can be directed to the right or left, or both directions simultaneously.

The manufacturer's center feed switch is supplied with two hangers for easy roof mounting and the center feed terminal lug comes in varied sizes to fit any feeder wire. The switch has a rubber handle and fibre guard for added protection. Trolley wheels can pass through the switch when it is open or closed, and the runners are said to be equipped with a knife edge approach to insure a smooth underrun.

Protecting Wartime Stockpiles of Coal From Fire

Indicators and quenchers to protect large industrial stockpiles of coal from fires created through spontaneous combustion is brought to the attention of industry by Coal Specialties Company, 50 Church Street, New York, N. Y. Known as Hot Spot indicators (which were developed during the last war), the manufacturers point out the service these indicators render under the present emergencies which demand protection of coal stockpiles. These indicators when spaced not further than 20 ft. apart are said to afford positive protection against spontaneous combustion which may develop without notice, in any part of the coal pile. The tendency of soft coal to overheat, especially when first stored, is well known. This weathering or rapid oxidation with resultant temperature rises of as much as 2 degrees a day, and usually doubling for each temperature rise of 15 degrees

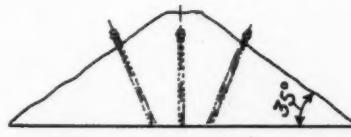
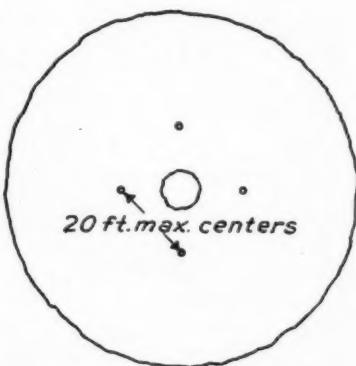
(such as summer weather), soon gets up into the danger zone of combustion of coal. The indicators are about 15 ft. long and are inserted about 20 ft. apart by hand in the coal piles vertically or at an angle. When the temperature in the coal pile reaches in excess of 150 degrees F., a fusible link in the indicator releases a spring



Typical spacings of indicators in rectangular storage



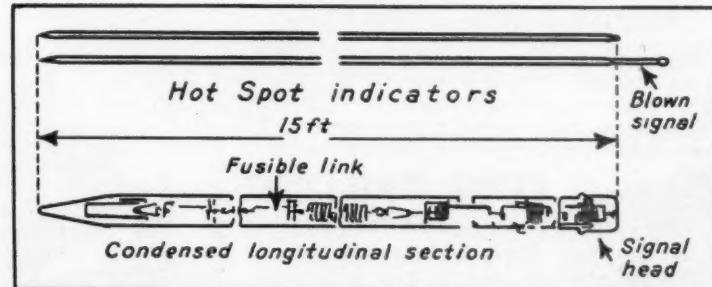
Blown signal on hot spot is indicated by arrow



Location of indicators in conical pile

which extends the signal head, indicating to the watchman that the danger zone of combustion has been reached in that area of the coal pile. Each indicator simultaneously watches temperatures within a horizontal radius of 10 ft. at seven different levels.

The so-called Hot Spot quenchers are inserted in the coal piles where the danger zone indicators have been withdrawn. These quenchers utilize readily obtainable dry ice which gives off freezing carbon dioxide gas which puts out the fire. No digging or bulldozing of coal is said to be necessary to get at these hot spots. The carbon dioxide gas from the dry ice quickly fills the voids between the lumps of coal, thus cooling the heated area and preventing further combustion.



Sketch of indicator. The number required to safeguard a specific tonnage of soft coal varies with the height of the pile as well as with its length and depth. Shallow areas of coal need no protection

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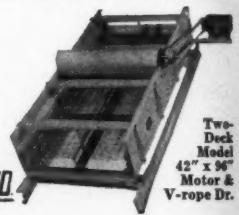
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2172560 and other Patent applications Pending.

